DOCUMENT RESUME

ED 076 228 LI 004 337

AUTHOR	Lawson, Rodger S.
TITLE	Perspectives on the Development of a Comprehensive Labor Market Information System for Michigan.
INSTITUTION	Upjohn (W.E.) Inst. for Employment Research, Kalamazoo, Mich.
SPONS AGENCY	Michigan State Dept. of Education, Lansing. Vocational Education and Career Development Service.; Michigan State Office of Manpower Planning, Lansing.
PUB DATE	Apr 73
NOTE	79p.; (106 References); Methods for Manpower Analysis No. 6.
AVAILABLE FROM	W. E. Upjohn Inst. for Employment Research, 200 South Westnedge Ave., Kalamazoo, Mich. 49007 ($1.75)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Data Bases; Information Sources; *Information Systems; Labor Force; *Labor Market; Manpower Needs; Systems Development
IDENTIFIERS	*Michigan

ABSTRACT

This report recommends a course of action for the State of Michigan to follow in developing a comprehensive labor market information system as a basis for planning educational curricula and for delivering other manpower or human resource development services. The author gives a broad conceptual definition of a comprehensive manpower information system; defines Michigan's need for such a system; and considers some ways in which unmet needs could be resolved. Essential data elements are described in terms of the needs of the system's users: individuals seeking work, state and local governments in the process of planning and evaluating programs, employers, counselors, and job developers. Appendix material includes a description of the components of a comprehensive manpower information system and a directory of current sources of labor market information for the nation as well as for states and local areas. The report outlines some of the federal initiatives in providing labor market information and some of the research being done on methods for providing such information. It concludes with specific recommendations regarding: the development of a comprehensive labor market information system for the state; program priorities; and, means by which the needs of local area data users can be met. (Author)

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Methods for Manpower Analysis No. 6

PERSPECTIVES ON THE DEVELOPMENT OF A COMPREHENSIVE LABOR MARKET INFORMATION SYSTEM FOR MICHIGAN

Prepared for the Michigan Department of Education,
Vocational Education and Career Development Service
and for the State Office of Manpower Planning

By

Rodger S. Lawson

April 1973

The W. E. Upjohn Institute for Employment Research

LI 004 337

THE W. E. UPJOHN INSTITUTE

FOR EMPLOYMENT RESEARCH

The Institute, a privately sponsored nonprofit research organization, was established on July 1, 1945. It is an activity of the W. E. Upjohn Unemployment Trustee Corporation, which was formed in 1932 to administer a fund set aside by the late Dr. W. E. Upjohn for the purpose of carrying on "research into the causes and effects of unemployment and measures for the alleviation of unemployment."

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This publication is for sale by the Kalamazoo office at $1.75 per copy.

PREFACE

In Michigan, as in other parts of the country during recent years, interest has been growing in the development of a labor market information system to support the provision of education and manpower services at the state and local-area level. This increased interest has prompted a number of disjointed efforts by various clienteles to develop systems that will satisfy their own data requirements. Unfortunately, these efforts have not been successful.

The failure of these efforts can, in many instances, be traced to one or a combination of the following factors: (1) an imprecise definition of data needs or requirements, (2) a myopic view of the requirements by administrators leading to duplicative and costly *ad hoc* solutions to the problem, (3) unawareness of existing sources of labor market information, (4) unawareness of federal initiative to provide labor market data for states and substate regions, (5) a lack of knowledge of the techniques used to collect labor market data and therefore of the limitations of these data, and (6) an unrealistic assessment of the resource commitment required to provide comprehensive labor market information.

This study has been prepared with the hope that the information contained herein will assist administrators and planners in eliminating these stumbling blocks to success and will contribute to the development of a comprehensive manpower information system for the state.

I would like to express my appreciation to the State of Michigan, Department of Education, Vocational Education and Career Development Service for providing financial support for this study. Special thanks are given to Eugene C. McKean for his assistance in compiling the information appearing in Appendix A. I would also like to thank my secretary, Mrs. Betty Hume, for her help in the preparation of this manuscript under what has been a rather severe time constraint.

The views expressed in this study are my own and do not necessarily represent those of the W. E. Upjohn Institute for Employment Research.

Kalamazoo, Michigan
April 1973

Rodger S. Lawson

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I. INTRODUCTION

The search for quantitative information has been rapidly expanding as a result of the data specifications and requirements of social planners, econometricians, and systems analysts. The social statistics employed and developed by these groups constitute a valuable instrument for the betterment of human life. Without the organized information which the data provide on our complex society, we would at best have only a vague notion of where we stand. And while they do not constitute knowledge in and of themselves, social statistics do provide a basis on which a systematic body of tested knowledge can be built. With them we are in a position to devise new social policies and to improve or reject the old, and to do so more on the basis of reasoned experience and less on the basis of prejudice and guesswork. More importantly, in a dynamic world social statistics provide a foundation for the revision and redefinition of social goals and priorities and the means for judging their achievement once they have been articulated.[1]

Data relating to the structure, conduct, and performance of national labor markets comprise some of the important indicators of a nation's economic well-being. For example, indicies reflecting rapid increases in productivity and earnings and low levels of unemployment are generally recognized as indicators of a viable and growing economy and hold out the prospect of an improving standard of living for the nation's population. Moreover, these same indicies constitute important inputs into the decisionmaking process that produces current and future economic policies for the country.

During the past decade local labor market information has become increasingly important in the decisionmaking process and has, in fact, become essential to the execution and analysis of public policy aimed at curing the socioeconomic ills of society. The new emphasis placed upon this kind of data has come about as a result of a number of factors, not the least of which have been: (1) the greater sensitivity and awareness of the public to local problems; (2) the continuing shift of responsibility from the national level to the state and local levels; (3) the increasing professionalism of personnel in state and local governments; and (4) the application of scientific management principles in both the private and the public sector. Attendant upon this increased interest, however, has come a greater concern on the part of the users as to the scope and quality of the data being provided.

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[1] Solomon Fabricant, "The Role of Labor Statistics in the Quality of Life," a paper presented to the North American Conference on Labor Statistics, 28th Interstate Conference on Labor Statistics, Houston, June 8 to June 12, 1970 (Washington: U.S. Department of Labor, 1972), p. 103.

State and local officials, program planners, and analysts, as well as other clientele who use this type of disaggregated information, have complained because they feel that the data collected and distributed under the existing system in many instances possess unknown reliability, lack structure, and fall short in terms of timeliness and detail. In Michigan as in other sections of the country, this dissatisfaction has prompted a reappraisal of the current arrangements for providing labor market information and of the content of such information. The answers to five separate, though obviously interrelated, questions are being sought in this connection. These are: (1) What data elements belong in a state or local area labor market information system? (2) Who are the real users of this information and what are their needs? (3) What are the sources of this information, and are those presently available adequate? (4) Can a system be designed that will better meet the needs of users? (5) How can the performance of a designed system be judged?

During the past several months the W. E. Upjohn Institute for Employment Research (the Institute) has welcomed the opportunity to assist the Michigan State Office of Manpower Planning and the ad hoc Occupational Demand Study Group in trying to arrive at answers to at least some of these questions. The major responsibility of the Institute during this period has been: (1) to evolve a statement of the need, should one exist, for the development of a comprehensive manpower information system in the state; (2) to consider some alternatives for meeting these needs; (3) to identify some of the conceptual as well as practical difficulties associated with these alternatives; and (4) to offer recommendations as to which of the alternatives offered appears to be the most appropriate, given the constraints posed by Michigan socioeconomic and political characteristics. This report details the results of the research conducted by the Institute with respect to these topics.

For convenience and ease of reference, this report has been divided into several sections. The first discusses and outlines what data elements ought to be contained in a comprehensive manpower information system (CMIS) and, in fact, defines what a CMIS is. The second deals with the need for this system; the third, with the existing sources of data; the fourth, with the additional data elements required; the fifth presents a basic discussion of the current state of the art associated with the provision of these new data items; and the sixth contains our recommendations for future action.

Before proceeding, however, there are several limitations of this report that need to be stated. To begin with, we have not attempted to quantify in monetary terms the costs to society that must result when information of unknown reliability is employed either to influence individual decisionmaking or to plan and evaluate the performance of programs. Nor have we tried to assess the cost of lost opportunities as a basis for rationalizing the need for collection and dissemination of labor market information. Moreover, we have left it to others to make the final judgments

as to who the principal beneficiaries of an information system are and to examine either conceptually or monetarily what value the information provided really is.[2]

In addition, with less than two months of total time allowed for preparation of this report, it is ludicrous to presume that each of the topics deserving consideration has been adequately covered. While we have tried to present as broad an overview of this topic as we possibly can, the time constraint has forced us to limit our investigation of topics in almost every instance and in some cases has forced the deletion of certain items which would otherwise have been included. Furthermore, it has precluded basic intensive research from being conducted on any of the topics. Our recommendations, as a result, are based on information derived from an amalgamation of three procedures, none of which is wholly satisfactory or independent of the others. These included: (1) the assembly and review of published and unpublished reports and related literature which provide some indication of the ground that has already been plowed; (2) "creaming" the knowledge and expertise of manpower officials and experts, especially those associated with the Manpower Administration and the Bureau of Labor Statistics in Washington, D.C.; and (3) onsite interviews with administrators and researchers who for the most part have been responsible for the provision of major elements of manpower information in their respective states.

While it is obvious that more work on each of the topics could and probably should be done before a final policy is adopted, the information provided and recommendations made here should be sufficient to make at least the initial decisions required if the current system is to be improved.

Finally, in the report that follows we have chosen not to distinguish between what some authors have chosen to call "labor market information systems" and others have termed "manpower information systems." Though there may be some reason to consider the latter concept as a broader collection of data elements, these, nevertheless, do have secondary and tertiary effects upon the market and can, we believe, be considered labor market information just as well. Thus we have freely interchanged the terms in this report.

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[2]Margaret Thal-Larsen, with Stephen Laner and Donald Mayall, Requirements and Design of a Labor Market Information System for a Large Metropolitan Area (Berkeley: Human Factors in Technology Research Group, University of California, 1972), pp. 7-8.

II. ESSENTIAL DATA ELEMENTS

Certainly one of the most important steps in analyzing the question of whether a manpower information system should be developed in Michigan is to spell out exactly what it is we are talking about. Questions pertaining to the relationship between the data elements contained in a manpower information system and the provision of manpower and training services must be answered. Moreover, the elements of the system must be broadly defined. Without this information we can speak only in vague generalities about the problems associated with the system's development. Since there are ample difficulties associated with the design and implementation of a system even when we are certain what we are discussing, we can see no reason to cloud the issue further by avoiding the topic.

The purpose of manpower programs--broadly defined to include all education, training, and human resource development efforts--is to deliver services to a particular clientele, again broadly defined. Economists have long since recognized the importance of the free flow of accurate information in the marketplace, and the inefficiencies produced when it is not available. More and more, however, officials, administrators, analysts, and planners are awakening to the fact that the successful delivery of manpower services is critically dependent upon access to reliable, timely, detailed, and structured information related to the functioning of the labor market. Unfortunately these realizations have for the most part resulted either in less than adequate information being used as a basis for action or in largely uncoordinated and inefficient efforts to assemble the data required. To avoid these problems, a system through which large amounts of data can be accumulated, processed, and disseminated efficiently among many classes of users is required. Such a system must relate to all the clientele it serves and to the problems that are pertinent to them.

Since the parameters of the system are determined by the clientele and the uses to which they put the information, it is appropriate that we ask who these groups are and what purposes the data serve. Three groups of users can be identified. First, there are those whom we shall refer to as direct participants in the labor market. Included in this group are: employers; persons actively in the labor market whether employed or unemployed; those undergoing training or schooling to acquire occupational skills; those requiring supportive or rehabilitative services; those who are suffering from racial or other biases or prejudices; and finally, the residual group who no longer consider themselves as active participants in the labor market for whatever reasons. Second, there are the direct intermediaries or the persons who assist others in preparing for and entering the world of work. Included in this group are vocational counselors, school administrators, curriculum planners, and public and private employment service employees to name but a few. Finally, there are those whom we shall term indirect intermediaries or those persons primarily responsible

for the framing and implementation of general socioeconomic policies.[1]

Similarly, we can define three general functions to which the data elements contained in a labor market information system will be put. These functions, just as did the identification of the clientele, help to define the general parameters of the system. To begin with, the data elements must function as a basis for the provision of direct services to individuals. This means that information pertaining to: (1) job placements, (2) job development, and (3) vocational guidance must be included. Second, any comprehensive system must support state and local-area administrative services. The data elements, therefore, should be adequate to carry out the planning and evaluation of manpower programs as well as to provide information necessary for the completion of other administrative functions. Finally, a comprehensive labor market information system should be capable of filling information requests from schools, government agencies, employers, etc. That is, it should provide informational services to the community.

Up to now we have considered in a very loose fashion what the general parameters of a comprehensive labor market information system are. That is, we know that it must serve a certain clientele and assist in the completion of certain functions but that's about all. As yet we have not considered what elements actually comprise the system; nor do we know much about the format in which this information should appear. Some persons would perhaps argue that, to be truly comprehensive, a labor market information system must include any and all data elements which the clientele of the system consider important for effective and efficient operation. However, this concept is vague and does not really add much to our stock of knowledge about the system. Moreover, it may be only partially correct.

Hopefully we can clarify this issue with the aid of Figure II-1. Here we have attempted to depict a model of the relationships that exist between various sets of information in order to put together those elements which are essential to the formation of a comprehensive manpower information system.

Initially we considered a system to be comprehensive as long as it provided a mechanism for rationalized data-gathering efforts and had a format that could be shared among many classes of users. To this notion of comprehensiveness, however, a provision needs to be added. Specifically, all or most of the elements of the system must be required in varying degrees by each class of user, and at least a few of the elements must be required to a high degree by each of the clienteles. We have not considered as labor

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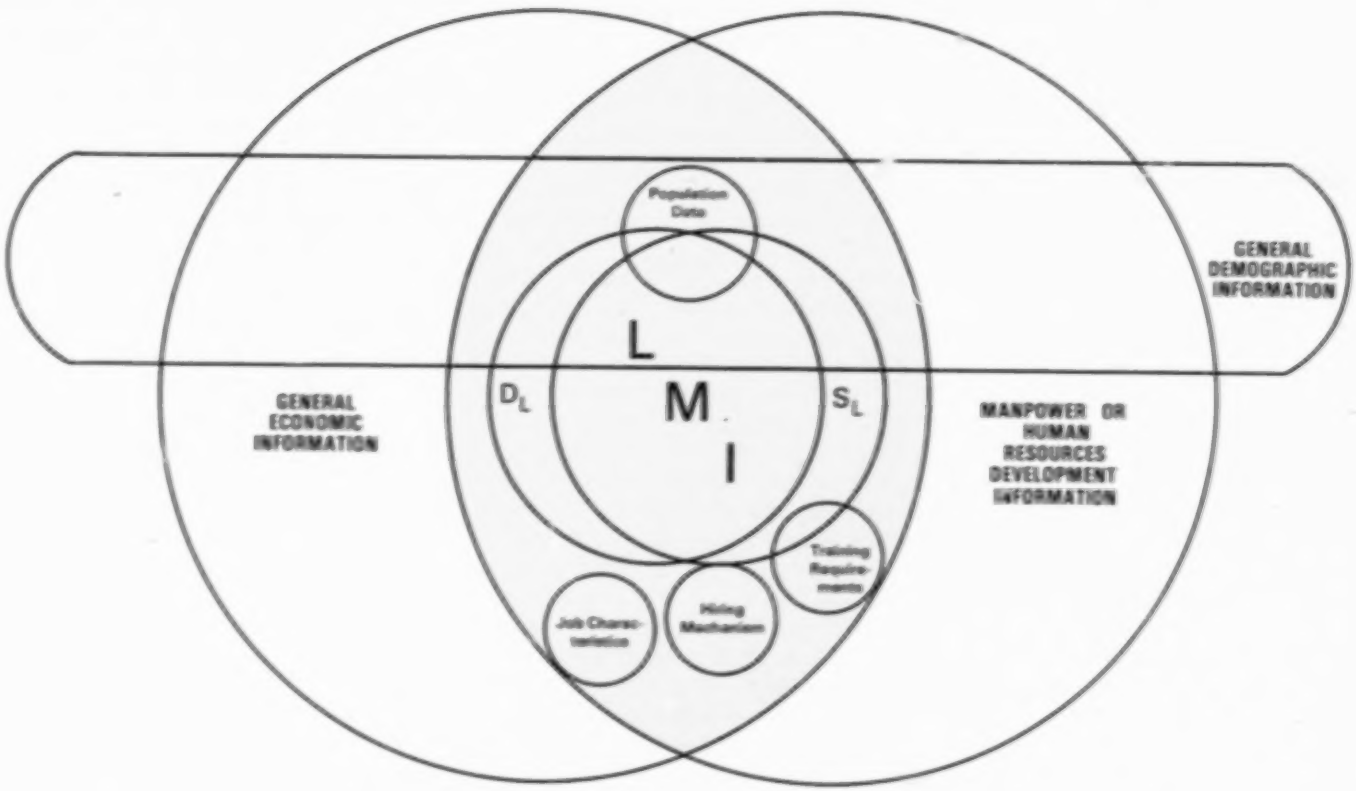
[1] Margaret Thal-Larsen, with Stephen Laner and Donald Mayall, Requirements and Design of a Labor Market Information System for a Large Metropolitan Area (Berkeley: Human Factors in Technology Research Group, University of California, 1972), pp. 14-15.

Figure II-1

Comprehensive Manpower Information System Model



Note: The shaded area represents the set of data elements which belong in a comprehensive manpower information system.

LMI - The set of information which describes the equilibrium characteristics of the labor market.

D_L - The set of information pertaining to the demand for labor.

S_L - The set of information pertaining to the supply of labor.

market information, therefore, all of the items with which the employment or school counselor or even the placement officer must be conversant in order to bring his clients to the status of job-ready individuals.

The relevant data set for a CMIS is formed by the combination of three information subsets. We classify these subsets: (1) general economic, (2) general demographic, and (3) manpower or human resource development. Several characteristics of the data elements contained in this combination need to be noted.

First, the class of clientele we termed as direct participants was defined broadly to include persons both within and outside the traditionally defined labor market. This means that the information necessary to support the delivery of manpower services at the state and local levels needs to be much more inclusive and comprehensive than would be the case if the clientele were limited strictly to labor force participants. In other words, it should transcend the data concerning present or anticipated imbalances between the supply and demand for labor in the market. As an illustration, consider the subset of information concerned with the mechanics of applying for work. While this does have an indirect impact on the labor market in the sense of reducing the supply of workers available to apply for job vacancies, it does not in the narrow sense of the word constitute labor market information. Nevertheless, this information seems important if we are to move discouraged workers not now in the labor force, as well as those persons receiving education or training in various skills, into the world of work. A comprehensive labor market information system, now broadly defined, should consist, therefore, of both quantitative and qualitative (narrative) information concerning more than the structure and behavior of labor markets and the socioeconomic forces evident in these markets. It must also contain information on the sociodemographic composition of the labor force, training requirements, job characteristics, emerging and new occupations, as well as on the hiring and employment process.

Second, all of the elements contained in the system have a strong economic bent. That is, they are all part of the larger subset of general economic information. This is justified because manpower policies and programs, properly conceived and implemented, are essential elements of basic overall socioeconomic goals and objectives. It follows that manpower services rendered as part of these programs have meaning only in the context of an economic environment. Consequently, the information fundamental to the process of delivery and evaluation of these programs is economic by nature.

Figure II-1 can also be viewed as a pedagogical device. For some time now there has been active discussion in the state as to whether a system should be established to provide projections of labor demand on an occupationally specific basis, the justification being that administrative planning and evaluation of programs could not be adequately performed

without it. Hopefully, with the aid of Figure II-1, it can be explained why focusing efforts on this single subset of information would constitute a rash and inadvisable action.

To begin with, information pertaining to the demand for labor, either current or projected, constitutes but one subset of information about the economy while the information on the supply of labor constitutes another. Interestingly enough, neither of these data sets alone provides much information about the conditions that prevail in the marketplace for persons with particular sets of skills. It can be learned from the demand information, for example, that job vacancies at a particular moment in time do exist. However, without knowing the number of persons who already possess the skills required to fill these vacancies, there is no way of determining whether these openings reflect an actual excess demand, or a transitory, structural disequilibrium condition in the market. It is, of course, the market equilibrium information that is required before the administrative service functions of program planning and evaluation, which the system is to accommodate, can be accomplished. This does not deny that the development of either one of these sets of complementary information (supply or demand) might not constitute an important first step in the total system's development.

Margaret Thal-Larsen, in investigating essentially this same topic, interviewed both formally and informally various classes of intermediaries functioning at the area level (the six-county San Francisco Bay Area). She asked these intermediaries what information they considered essential if they were to perform their duties effectively. From the responses which she received she noted that generally speaking the kinds of desired information elements were no different from those required at higher administrative levels or for larger geographic entities.[2] From these responses four classifications of desired data elements emerged. Because these classifications neatly categorize the data elements we have been discussing into a convenient taxonomy, we present her definitions below.[3]

(1) Current Job Opportunities Information: These data elements, ranging from the particular to the general, in part descriptive and in part quantitative, essentially portray the contemporary labor market. But, strictly speaking, they need not be either "current" nor limited to job vacancies as such.

(2) Job Prospects Information: These data are comprised of both descriptive and quantitative information concerning future occupational trends. Included also should be material on expected changes that may occur in job and worker

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[2] Ibid., p. 15.

[3] Ibid., pp. 49-51.

characteristics which will affect future labor demand and supply relationships.

(3) Current Demographic and Economic Information: This quantitative and descriptive data pictures the community in which the clienteles function. Combined under this heading are current, local-area statistical data relating trends in population and the labor force growth; information concerning the community's physical facilities, its current business conditions, and its economic outlook--most notably in terms of its future economic development. The component for which the greatest need was expressed, however, was for timely demographic data (supply information).

(4) Agency Information: The administrative, or operating reports of agencies and schools. Not all such reports, however, should be included in a labor market information system. Only that data that is useful in portraying or interpreting the labor market situation, and likewise labor market information useful for administrative planning and evaluation need be included.

Later in this report we shall refine these general data categories even further. At that time comparisons between system requirements and current data-collection efforts will be made, and new data requirements will be determined.

As yet we have avoided discussing what, if any, general properties the data elements, and for that matter the system itself, should possess. By addressing this question we can, in addition to learning more about the properties of the system, develop a set of criteria by which existing data elements and systems can be judged. In discussing the properties, however, we must speak in generalities. There are several good reasons for this. To begin with, in many instances the parameters assigned to these criteria will depend upon mutually acceptable agreements being reached by users of the system. Second, given the diverse nature of the data elements that appropriately belong in the system, it may not be possible on an a-priori basis to determine a set of specific rules that can be applied in all cases or to all data elements. Third, budgetary constraints may result in some of the criteria being partially sacrificed, or may cause tradeoffs between the criteria to be made.

Nevertheless, it is important that some basic guidelines be established as a reference point for evaluation. Therefore, we suggest that the following five be adopted: First, all data elements contained in a system must be judged to be pertinent; that is, each of the elements in a system should be highly important to at least one class of clientele and not unimportant to most of the others. Simply stated, this means that the data must be needed. Second, the information must be reliable. This means that

the most technically advanced methodologies should be used in the assembly and analysis of the system's elements, and that the greatest attention should be given to the development and maintenance of high standards of quality control. Third, the data should be detailed both geographically and in terms of the information supplied. Fourth, it should be timely and readily available. Finally, it must be structured; that is, the system and its components should preserve uniformity with respect to data coverage, collection, analysis, and reporting procedures through time as well as for various geographic divisions.

III. THE NEED FOR A COMPREHENSIVE MANPOWER INFORMATION SYSTEM

In this section we have analyzed the need for a comprehensive manpower information system in Michigan. The discussion separates logically into two parts. The first considers the reasons why this kind of information has been requested or demanded; the second concerns the refinement of our general definition of the system's elements. Before embarking, however, several limitations of the discussion should be noted. To begin with, the Institute has not considered whether the rationale or justification given by the various state agencies for having this kind of data is valid. To do so would require virtually an audit of every agency's goals, objectives, and program responsibilities and would force us to enter the dimly lit abyss of information theory. Obviously, time constraints precluded such an undertaking. In addition, it was felt that in at least some instances these requests were submitted by the agencies in response to planning or reporting requirements over which they possess very little discretionary power. Where this occurred, there appeared to be little gain in disputing the validity of these requests.

Second, we cannot be certain that the data elements listed below either completely or accurately reflect the total spectrum of information needs in the state. There are two reasons for this. In the first place, the majority of these elements were identified as a result of a survey of clientele conducted in the San Francisco Bay Area of California over two years ago. Clearly, there is no way to guarantee that the requirements identified there will exactly match those of their counterparts in Michigan today. Second, what little survey work that was conducted in Michigan consisted of nothing more than an interagency information request and was directed toward the need for occupationally specific information only. Since not every agency responded, or was asked to respond, it is difficult to conclude that the information provided by these instruments represents a consensus of the state government agencies. Despite their deficiencies, however, these elements are probably reasonably representative of the attitudes prevailing in the state and are certainly adequate as a first approximation of what the elements should be.

Of the several reasons given for having detailed state and local-area labor market information, none has been more profusely expounded than the planning and evaluation motive. According to this argument, or at least one version of it anyway, the free market system does not respond rapidly enough to prevent bottlenecks from developing in the delivery of manpower and training services. Moreover, the market system requires excessive and costly flexibility on the part of employers, workers, and training institutions. Furthermore, it cannot be said that it has always worked perfectly as evidenced by the persistent excess demand for physicians and the glut of school teachers which exist in this country today. The solution to these as well as a host of other problems, according to the proponents, lies in planning based on forecasts of future labor market activity.

This trend toward greater use of program planning and evaluation at the state and local-area level has been spurred by several not unrelated occurrences of the past few years. One of the most important of these has been the change in national manpower policy toward greater decentralization of administrative controls and the placement of job-ready jobseekers.

Still another factor has been the manpower and education legislation passed during the sixties that emphasized the need for programs to relate to current as well as forecasted labor market conditions. The Area Redevelopment Act of 1961, the Manpower Development and Training Act of 1962, the Vocational Education Act of 1963, the Amended Vocational Education Act of 1968 and 1972, and the Higher Education Facilities Act of 1963 were concerned with the education and training needs of the nation. Some of these acts specifically provided that occupational needs be one of the factors on which education and training programs are based. Probably the single most influential piece of legislation in this area has been the 1963 Vocational Education Act as amended. This legislation provided for a cooperative arrangement between the state offices of vocational education and the public employment service. Among other things the law states that ". . . the State board shall give particular consideration to those vocational education programs which are best designed to (1) fulfill current or projected manpower needs . . . , or (2) fulfill new and emerging manpower needs at the local, state, and national levels by preparing students for new and emerging job opportunities at such levels."[1] Unfortunately, in many instances, neither the state employment service offices nor the vocational educators have been able to furnish the information which is required to fulfill this charge. Other legislation, such as the Economic Opportunity Act of 1964, the Civil Rights Act of 1964, the Higher Education Act of 1965, and the Appalachian Regional Development Act of 1965, focused additional attention on the need for up-to-date labor market information. This legislation and the expenditures that followed for education and human resource development made planning a necessary first step for program implementation, and have contributed to the need for more and better labor market information.

A third influence has been the increasing use of cost-effectiveness, cost-benefit, and Planning, Programming and Budgeting System (PPBS) techniques as a basis for decisionmaking at the state and local-area level. These forms of analysis, largely quantitative and technical in nature, have emerged as probably the most important tools for analyzing alternative resource uses by government decisionmakers. However, major advances such as these are sterile in the absence of data permitting their significant application. As their use continues to expand in the human resource development area, pressures

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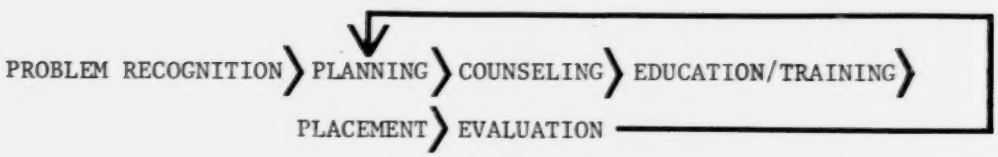
[1] U.S., Congress, Vocational Education Act of 1963, Public Law 88-210, 88th Cong., 1st sess.

will continue to be brought for the provision of reliable data elements that can be used within their framework.

The stress placed upon the need for labor market information as a consequence of the desire to improve the delivery of manpower programs (broadly defined), especially at the state and local-area level, is not the major justification for having highly specific, structured, and reliable data.[2] It rests rather with the nature of the manpower service itself. To say the least, this notion is vague. Our perceptions need to be and can be sharpened, however, by viewing this service as a complex system. Characteristic of all such systems, manpower service represents a high order, multiple loop, nonlinear feedback structure. As with other systems, it contains an interlocking network of feedback loops where each feedback loop describes or contributes to the description of the total environment surrounding a decision point in the system. The decisions made lead to courses of action that change the state of the surrounding system and give rise to new information on which future decisions are based.[3] An admittedly simplistic view of such a system is illustrated in Figure III-1.

Figure III-1

The Manpower System



[2]Louis Levine, Labor Market Information for the Local Delivery of Manpower Services, a report prepared for the Manpower Administration (Washington: 1972), p. 28.

[3]Jay W. Forrester, Urban Dynamics (Cambridge: The MIT Press, 1969), pp. 107-108.

As depicted, the manpower system has six states or stages: (1) problem recognition, (2) planning, (3) counseling, (4) education/training, (5) placement, and (6) evaluation. For simplicity we have shown only one of the most obvious of the feedback structures; namely, that from evaluation to planning.

Two highly important features of the actual complex system can be understood using this simplified structure. To begin with, it is essential to recognize that actions taken at each stage in the system give rise to new information. The provision of education and training, for example, generates additional data elements on skill levels of potential members of the labor force. Similarly, placement services produce information on the characteristics of the unemployed. While conceptually some of this information is fed back through the system and helps to condition new decisions, these actions have another effect. They produce information that conditions the user and increases his awareness of the environment in which he functions. This in itself constitutes a valuable manpower service to users of the system.

The second important feature of the complex system illustrated by this model is its informational requirement. None of the actions occurring at the various stages of this model can be undertaken in the absence of labor market information. Two illustrations of this point should suffice. Consider, for example, the meaning or value of providing placement services in the absence of data on current job opportunities or alternatively of providing vocational counseling without some reference data on future job prospects. It follows that the solution of clientele problems and the provision of manpower services are critically dependent upon the information content of the system. In recognizing this point Levine has stated that: "the very essence of manpower services and therefore an integral element in their rendition is the LMI [labor market information] content."[4] It follows, therefore, that the essential element of all local manpower services is information pertaining to labor markets.

Finally, there is one other rather obvious reason that we can cite for having comprehensive labor market information supplied. Simply stated, it appears that there is already a rather substantial and growing market for this kind of information. Though we have not tried to document thoroughly this hypothesis, we do know that at least two state agencies have sought somewhat independently to purchase labor market information that properly considered belongs in a statewide system. Moreover, if our experience at the Institute is any indication, it appears that local-area manpower planners, educators, and government officials are seeking outside assistance for the development of localized systems within their areas of jurisdiction

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[4]Levine, op. cit., p. 10.

with greater frequency. With such a flurry of activity, it seems only logical to consider methods by which these users can be satisfied and at the same time substantial economies can be incurred. While cost data for comparison are not presently available, there is ample theoretical justification to assume that one consolidated effort could satisfy the basic needs of most users and at the same time reduce the total resource requirement needed. However, even if the costs of development and maintenance of a centralized system were no less than for a number of scattered elements, the ancillary benefits of uniformity and consistency of the former approach would require our recommending it.

We have already outlined the structure of a labor market information system. It is time, however, to refine this general statement and fill in at least part of this superstructure with specific data elements. For purposes of this discussion we have used the results obtained in the Thal-Larsen clientele survey and the agency-needs reports which were submitted to the State Office of Manpower Planning. We have made additions where we felt that obvious gaps existed. Because the scope of the inquiries underlying the two principal information sources was substantially different, we have not attempted to mesh the results into one unified listing. Instead, the data elements corresponding to the basic structural framework that we outlined earlier appear first (Table III-1).[5] This is followed by the agency-needs responses in Table III-2.

Before discussing the data sources that currently exist, a few comments relating to the information in these tables seem in order. In the first place, there was heavy emphasis on increasing the supply of labor market information cross-classified by occupation. This result is not surprising in the case of the agency-needs responses because of the way in which the questions were phrased. Nor was this altogether unexpected in the Thal-Larsen responses considering the emphasis being placed by school counselors and vocational educators on the need for this kind of information.

It was also emphasized that improved methods for identifying both employers and current job opportunities were needed. In fact, in California the respondents were almost unanimous in their insistence that they do not now possess current job opportunities information in the amount, kind, and quality required.[6]

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[5]This table represents in large measure a synthesis of the needs reported by respondents in the California study. For a detailed discussion of these results, see Margaret Thal-Larsen, with Stephen Laner and Donald Mayall, Requirements and Design of a Labor Market Information System for a Large Metropolitan Area (Berkeley: Human Factors in Technology Research Group, University of California, 1972), pp. 7-8.

[6]Ibid., p. 81.

Table III-1

Information Elements for a Comprehensive

Labor Market Information System

I. Current job opportunities

A. Locational and identifying information about employers, by establishment

B. Establishment of labor demand, by occupation (total current job opportunities)

C. Distribution of total employment, by occupation

D. Descriptive information
   1. Characteristics of "typical job," by occupation
   2. Characteristics of "worker customarily hired" in the occupation

E. Indicators of labor supply, by occupation

F. Indicators of labor demand/supply relationships, by occupation

G. Labor turnover, by industry and by occupation

H. Specially processed or supplementary information
   1. Establishment potential for employment of special-worker groups, by occupation
   2. Training opportunities, by occupation
   3. Apprenticeship opportunities, by occupation
   4. Licenses, credentials, and certificates
   5. Employment-related supportive services
   6. Unions
   7. Hiring channels
   8. State and local-area commuting patterns and transportation facilities
   9. Occupational mobility

II. Job prospects information

A. Period projections of activity
   1. Anticipated short-term total labor demand, by occupation
   2. Anticipated longer term total labor demand, by occupation
   3. Anticipated short-term labor supply, by occupation
   4. Anticipated longer term labor supply, by occupation

Table III-1 (continued)

Information Elements for a Comprehensive

Labor Market Information System

B. Probable changes in the characteristics of the "typical job"

C. Probable changes in the characteristics of "worker customarily hired" in the occupation

D. Occupational trends

III. Demographic and economic information

A. Demographic data: current annual estimates of the population, by specified area

B. Economic data
   1. Current annual and quarterly estimates of the labor force, by specified area
   2. Indicators of manpower service needs, by specified area
   3. State and local-area employment trends
   4. State and local-area economic outlook
   5. Longer term employment projections, by industry
   6. State and local-area wage rates

IV. Agency information

A. Labor demand: job orders

B. Labor supply
   1. Job applicants
   2. Unemployment insurance claimants
   3. Training program enrollees

C. Referrals

Table III-2

Agency Responses to Data Needs Request
(Footnotes on page 20)

Data element	Michigan State Departments					
	Education			Labor	Corrections	Public Health
	Voc. Ed. Career Dev. Service	Vocational Rehab. Service	Other			
Current occupational structure of area	a	a	a	a	a	b
Projected occupational growth of area.	a	a	a	a	a	b
Estimate of occupational replacement needs . . .	a	a	a	a	a	b
Knowledge of skills and training required, by occupation.	a	a	a	a	a	b
Knowledge of usual sources of training	a	b	a	b	b	b
Knowledge of wages associated with occupations .	a	a	a	b	a	b
Knowledge of physical demands, by occupation . .	b	a	a	b	b	b
Knowledge of demographic characteristics of present labor force, by occupation	a	b	a	b	a	b
Knowledge of job environment (pressure for production, emotional stress, indoor work, etc.).	b	a	a	b	a	b
Knowledge of location of jobs in area, by occupation	a	a	a	b	a	b
Knowledge of promotion lines, by occupation. . .	a	a	a	b	a	b
Knowledge of age limitations, by occupation. . .	b	a	a	b	a	b
Knowledge of licensure and certificate requirement, by occupation	a	a	a	b	a	b
Other.	c	d	e	b	b	b

(continued)

Table III-2 (continued)

Agency Responses to Data Needs Request

Data element	Michigan State Departments					City of Detroit	MESC
	Social Services	Mental Health	Licensing	Civil Rights	Commerce		
Current occupational structure of area	b	b	b	a	a	a	a
Projected occupational growth of area.	a	b	b	a	a	a	a
Estimate of occupational replacement needs	a	b	b	a	a	b	a
Knowledge of skills and training required, by occupation	a	b	b	b	b	a	a
Knowledge of usual sources of training	b	b	b	b	b	b	a
Knowledge of wages associated with occupations	a	b	b	b	a	a	a
Knowledge of physical demands, by occupation	b	b	b	b	b	b	b
Knowledge of demographic characteristics of present labor force, by occupation	b	b	b	a	a	a	b
Knowledge of job environment (pressure for production, emotional stress, indoor work, etc.)	b	b	b	b	b	b	b
Knowledge of location of jobs in area, by occupation	a	b	b	b	a	a	b
Knowledge of promotion lines, by occupation.	b	b	b	b	b	b	a
Knowledge of age limitations, by occupation.	b	b	b	b	b	b	b
Knowledge of licensure and certificate requirement, by occupation.	b	b	b	b	b	a	b
Other.	f	b	b	b	g	h	b

(continued)

Table III-2 (continued)

Agency Responses to Data Needs Request

Note: These departments or offices were not asked to respond: Governor's Office of Manpower Planning; Departments of Administration, Agriculture, Attorney General, Civil Service, Conservation, Military Affairs, State, State Highways, State Police, and Treasury.

[a]Affirmative response.

[b]Considered data element nonessential or did not respond.

[c]Requested that data elements be provided for each of the 49 Career Education Planning Districts and that occupations be classified by the 194 U.S. Office of Education codes.

[d]Requested information on (1) impact of second-injury certifications for jobs in question; (2) availability of on-the-job training; (3) number of openings related to the current labor supply in the area; and (4) civil rights compliance implications.

[e]Adult and Continuing Education Services asked for the implications for future retraining of anticipated vacancies.

[f]Requested current job vacancy information disaggregated for sub-state regions, by prerequisite skill level and starting wage.

[g]Requested data on labor supply.

[h]Mayor's Office asked for information on the barriers to job entry by skill level.

IV. EXISTING SOURCES OF DATA FOR LABOR MARKET INFORMATION

Both the general framework for a comprehensive manpower information system and the data elements that it should contain have been discussed. The question of how these data elements should be provided, however, has yet to be addressed. Generally speaking, there appear to be three possible alternatives.

First, the agent responsible for the design and implementation of the system could develop a completely new data set. This would entail a gross waste of resources, however, since some currently ongoing data-collection efforts would be duplicated.

A second alternative would be to rely entirely on the existing system and try through reprocessing and analysis to piece together at least some of the items needed. The obvious drawback to this, of course, is that current data-collection efforts may not provide raw data that can be massaged to meet new system requirements. Moreover, there is no guarantee that the savings from using this approach, if in fact they exist at all, would be large enough to offset the loss in utility from not having access to desired data elements.

The third solution would be to combine the best elements of the present system with new programs to supplement current deficiencies. Intuitively, at least, this seems very appealing, although the quantity of resources required for development would probably exceed those necessary to implement the second approach. While admittedly this is a drawback, it is illogical to reason that just because one system costs less it should be preferred. In fact, this would be a sufficient reason only if the data elements contained in both systems were judged to be equally useful. If they are not, the cost criteria must be measured against the value of the information provided. The system providing the largest "payoff" in terms of usefulness per dollar of expenditure should then be implemented. Unfortunately, the data required to make such computations were not available to us. In their absence we can only conjecture that the combined approach would satisfy the largest payoff criteria.

Given any of these methods, however, there are ample reasons for knowing what data sources currently exist. At the very least, for example, this knowledge will provide an understanding of the deficiencies of the encountered system and will furnish a foundation upon which future systems development can be based. In addition, by comparing the existing data sources with those contained in the outline of the CMIS, we can determine some tentative priorities for future statistical effort. This is extremely important if a piecemeal approach to total systems development is required.

Appendix A is a directory of existing sources of labor market information for the nation and for Michigan. It is based on materials available in the Institute's library and on other materials known to be available. Because of the limited amount of time available for preparing the list, it was not possible to make a thorough review of the literature in the field. Neither was there any attempt to judge the adequacy of these data elements using the criteria of pertinence, reliability, timeliness, detail, and structure that were suggested earlier. In preparing the material, primary emphasis was given to sources of statistical data although several publications providing more general narrative information on current and projected trends in occupational employment are also listed. Wherever possible the following information about the sources was provided: (1) the name of the agency which collects or publishes the data; (2) the frequency of publication; (3) a description of the content of each data source; and (4) the level of geographic disaggregation.

V. NEW DATA REQUIREMENTS

Although we did not attempt to analyze the technical adequacy of the information sources listed for Michigan in Appendix A, some rather glaring deficiencies in the data can be identified from even a quick perusal of the list. For instance, many of the ongoing data-collection efforts are conducted to meet employment service program administration requirements. Because the scope of these programs is often quite limited, the data possess unknown reliability when used as a resource for a broader clientele. As an example, consider the labor supply data produced as a byproduct of the Employment Service Automated Reporting System (ESARS) program. Indirect intermediaries concerned with the planning of general socioeconomic policies for the state cannot rely on these data to reflect accurately the characteristics of the universe of unemployed workers since many of the jobless, especially those in professional and technical fields, do not use the employment service. We are not criticizing the ESARS program; we are simply saying that the program is not designed to accommodate the information needs of intermediaries outside those performing the administrative function.

In studying the current sources of information, it is also apparent that they are lacking in both occupational and geographic detail. Occupations common to manufacturing are stressed, for example, while relatively little attention is paid to those in the service sector. This trend is truly paradoxical when the growth in employment which has taken place in those two sectors is compared. The geographic inadequacies are equally as bad. In many cases information is provided only for a few large Standard Metropolitan Statistical Areas (SMSA's) and in some instances only for Detroit. This means that much of the outstate area does not have even basic local-area labor market information that is needed for service delivery.

The Census of Population does provide detailed information for the entire state. However, the data produced can hardly be considered to be timely when there are two- to three-year delays in processing and the survey is conducted only once every 10 years.

Moreover, much of the information now being collected lacks structure, and the sources for obtaining it are only slightly less varied than the required items themselves. Furthermore, there are no standard formats for presentation, or even a standard set of definitions so that items collected by one agency can be compared with those of another.

Because there was not time to analyze these sources thoroughly, we have been hesitant to criticize them too aggressively. Judging from our survey of the literature that has appeared recently, however, our concern over the adequacy of state and local-area labor market data is not unique. For example, the San Francisco Bay Area respondents ". . . emphatically dismissed as inadequate present sources of the information they require in

order to carry out their assignments."[1] J. E. Morton, in discussing the need for an information system, echoed these same sentiments when he wrote: "Since present statistical data obviously are not adequate to meet all the needs of the government's new management philosophy and procedures, the development of an appropriate information system to satisfy the recommended techniques of decision-making becomes a respectable objective . . . ."[2]

More specific criticisms can be found. Levine notes, for example, "The labor market ramifications of occupational information have received relatively little recognition locally . . . largely because of the gaps in occupational data derived from regular, recurring statistical reports whether originating within the Employment Security system or independently of program operations. Data on both the occupational composition of industries and the occupational staffing patterns of individual employing establishments have been sadly lacking with consequent adverse effects on understanding or resolving a number of manpower problems . . . ."[3]

Let us summarize briefly our discussion to this point and see what conclusions can be drawn from it. To begin with, it is quite apparent that direct participants as well as direct and indirect intermediaries at the state and local-area level are demanding labor market information that is pertinent to their needs, detailed, reliable, and structured. We have discussed these needs, and we have shown how they can be structured into what we have called a comprehensive labor market information system. We also know that, at best, the system which presently exists is only partially meeting these needs and that large gaps remain to be filled. The optimal solution to this problem would, of course, be to provide data that are wholly consistent with the structure that was outlined. If resources were unlimited in the state, there would be little hesitation on our part in recommending that this approach be followed. Obviously, this is not the case. Because constraints do exist, both in terms of resources and technology, we must seek suboptimal solutions which are consistent with them. This requires that priorities be identified with the data elements that comprise the optimal system.

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[1] Margaret Thal-Larsen, with Stephen Laner and Donald Mayall, Requirements and Design of a Labor Market Information System for a Large Metropolitan Area (Berkeley: Human Factors in Technology Research Group, University of California, 1972), p. 18.

[2] J. E. Morton, "The Emerging Information System and Manpower Research," in Dimensions of Manpower Policy: Programs & Research, edited by Sar A. Levitan and Irving H. Siegel (Baltimore: The Johns Hopkins Press, 1966), p. 244. [Emphasis added.]

[3] Louis Levine, Labor Market Information for the Local Delivery of Manpower Services, a report prepared for the Manpower Administration (Washington: 1972), p. 72.

The Institute has not attempted to provide a complete rank ordering of these items. In fact, only a few elements which are judged to be of critical importance to the various classes of clientele have been identified. This does not mean that the remainder of the items identified as belonging to a comprehensive system are considered unimportant. It means simply that time constraints have precluded our making any final judgment with respect to a full ordering of priorities.

The identification of various data elements such as employment, unemployment, labor demand and supply, and turnover by occupation lies at the very heart of a meaningful labor market information system. In fact, without these disaggregated data elements, a system would be only slightly more serviceable than the disjointed collection of elements that now exists. Before this information can be incorporated within the framework of a comprehensive system, however, the statistics themselves must be developed. To accomplish this, raw data on the employment of individual establishments by occupation, covering a broad spectrum of industries, need to be collected and analyzed. Because of the importance of this undertaking in terms of the overall schema for systems development, we consider the production of these raw data highest in priority.

Second, in terms of priorities for development--and there is very little difference between this and the first--is the collection and distribution of data pertaining to current job vacancies. These data can obviously be of great value in counseling, job development, and placement activities. Also, regional, industrial, and occupational detail on current job vacancies, together with data on unemployment, would be an asset in the planning and evaluation process connected with the delivery of manpower services, broadly defined.

Third in this list of priorities is the development of occupationally specific projections of labor requirements. This ranking was accorded principally because of (1) the emphasis placed on the need for this information for planning and evaluation by the responding state agencies; and (2) the reinforcement which the agency position received in the San Francisco Bay Area survey and in the other literature that we reviewed.

From our discussion it is apparent that we feel the provision of manpower services is inextricably intertwined with a comprehensive, accurate, timely, and structured information base. An integral part of this base is, or should be, facts concerning the equilibrium condition, either current or projected, of labor markets. To meet the requirements set forth above, this information cannot be confined to just one side of the market (either supply or demand). In fact, reliance upon estimates or projections of either of these variables without consideration of the other as a basis for manpower service provision is clearly unreasoned and risky. Therefore, the fourth and last data set included in this partial rank ordering of system development priorities consists of the assembly of labor supply data for a

set of occupation categories comparable to those adopted for use in the production of the system's demand or requirements information component.

Having identified these priorities, we shall now consider (1) methods for the creation of this information, and (2) the identification of "problem areas" that could impede the development of information in the state. We shall conclude with our recommendations for the development of a comprehensive system. We have not considered in this discussion, however, any material relating to the provision of information on currently available jobs. The reason for this is that efforts have already been initiated in the state to make these data available. The Job Opportunity and Labor Turnover Survey (JOLTS) program currently operated by the Michigan Employment Security Commission, though limited at the present time to the manufacturing sector and providing published data for only the Detroit SMSA, nevertheless represents an important first step in the development of this information for state and local areas.

Because of the time constraint, the Institute has not been able to consider the question of forecasting labor supply. This is an important deficiency since any meaningful analysis of employment problems depends on information about both sides of the labor market. In lieu of this analysis, several of the major problems associated with the forecasting of this element are sketched below.

Estimates of future labor market supply by occupation are made especially difficult at the state and local-area level by the character of the markets themselves. The labor force in this country, for example, is highly flexible, with most workers being able to transfer their skills to any of a large number of occupations. Similarly, employer requirements for most occupations are not rigidly defined within a fairly broad range. And with an open system such as ours, people move, if not freely, at least with relative frequency from one occupation to another and from one labor market to another. While these characteristics are important in moderating or eliminating imbalances that occur in the market for specific occupations, they make forecasting a very difficult job.[4]

Then too, the inadequate supply of fundamental data on which to base forecasts and the relatively primitive techniques that are available as a consequence have discouraged labor market analysts from getting too deeply immersed in the problem. Clearly, these inadequacies need to be addressed. Labor market analysts, theorists, agency administrators, and state and local government officials must become concerned if future changes in occupational structure and labor market disequilibrium conditions at the state and local-area level are to be anticipated.

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[4]Bruce McKinlay and Lowell E. Johnson, Forecasting Occupational Supply: A Methodological Handbook (Eugene: Oregon Department of Employment, 1969), pp. 1-4.

VI. PROGRAMS TO MEET NEW DATA NEEDS

A. The Margaret Thal-Larsen System

Throughout this report we have relied heavily upon the results of the user needs surveys conducted by Margaret Thal-Larsen and her associates in the six-county San Francisco Bay Area. It would be difficult to assess the value which this information has already had and will continue to have for planners and analysts of labor market information systems throughout the country. We doubt, however, that it will ever be overstated.

The research efforts directed toward defining, cataloging, and interpreting user needs constitute only one part of this undertaking. A second is comprised of an appraisal of the adequacy of the existing system to meet these needs, and the third details her blueprint of an ideal system for the San Francisco Bay Area.

This blueprint, or "first approximation," of the system that should be implemented is designed to meet all the needs of the various classes of user clientele which were identified through the survey work. As structured, it appears to have two important characteristics: first, it makes use of existing data generated as a byproduct of the current job order and referral process of the employment service; and second, it fills the gaps in this information with programs which are consistent with new federal initiatives in the development of labor market information. We have already speculated that this approach could result in an advantageous mix between user satisfaction and resource investment.

Administratively, the system is designed to be implemented through a cooperative arrangement among various clientele, but the primary responsibility for development and maintenance would rest with the employment service. To safeguard against technical degeneration in the data collection and analysis, however, the authors suggest that an advisory committee, comprised of officials and administrators who have the "power to act" and technical experts, be formed to assist the employment service in its efforts.

To meet all of the data requirements that were listed as being needed, each of 28 separate components defined for the system would have to be implemented. Appendix B of this report contains a brief description of each of these components along with a rough estimate of what it would cost to implement them in the Bay Area. The cost for the total systems development over a three-year period would be approximately $2.5 million, with slightly less than one million being spent the first year, and three-quarters of a million in each of the two succeeding years. According to the authors, however, this does not represent the entire cost of implementation since it does not include those associated with training the additional staff needed at the employment service.

Outwardly, at least, the Thal-Larsen system has many attractive features which would lead us to recommend its implementation in Michigan. It meets all of the data needs articulated in the clientele survey and potentially all of the evaluation criteria that have been suggested. Still there remain some very good reasons why the state should not adopt this system at the present time.

To begin with, it is obvious that the costs associated with providing the total system for the entire state would be prohibitive. Second, even if resources were available, we would hesitate to suggest that a commitment be made since the total system is untried--even in the Bay Area. It is anomalous, but the value which information has cannot really be judged, like other commodities, before it is supplied. Thus, while the system seems appealing, there is no guarantee that it would satisfy the needs of Michigan users and thus warrant its cost. Given the magnitude of the investment required and considering the potential risk, it does not seem advisable to make a total commitment until the system has been piloted and evaluated.

This does not mean that we do not favor adopting the general structure of this system as a working goal and implementing on a piecemeal basis those items which have already been tested. In fact, there are several reasons to suggest that this might be an appropriate approach. First, the goal itself provides direction for piecemeal efforts. Second, the development of elements on this basis draws together interested agencies and users and provides a basis for coordination and a unified effort. Third, it is consistent with the constrained maximization approach that we suggested earlier, and it permits the implementation of tested priority items first.

For these reasons, the Institute suggests that a goal consistent with the total systems concept defined earlier in this report be adopted in the state, and that programs consistent with this goal be undertaken on a priority basis.

B. The Labor Market Information System Project

Several times in this report the possible economies to be gained from using existing or encountered data bases gathered from ongoing administrative and statistical programs have been noted. In order to examine the feasibility of such usage, the Manpower Administration has funded The Institute of Labor and Industrial Relations, The University of Michigan-Wayne State University, to design a labor market information system (LMIS) using encountered data bases. While a final report covering the results of this project will not be forthcoming until the end of the year (1973), an outline and brief description of some of its components should suffice to show how valuable the results will be in terms of total systems development.

The LMIS project can be divided into four separate although clearly interrelated research efforts. The first and the principal one is directed

toward an analysis of the gaps, inconsistencies, and limitations of a selected group of encountered data bases and toward the development of techniques for the improvement and consolidation of these data bases. The data sources being studied in this phase include: (1) the ES 202 (Employment Service) report of employment and payrolls in firms covered by unemployment insurance; (2) the job orders and job applicants' records maintained in the Employment Service Automated Record System (ESARS) program; (3) the Social Security Continuous Work History Sample; (4) the 1970 Census of Population; (5) the Current Population Survey; and (6) the EEO-1 (Equal Employment Opportunity) report which details employment, by occupation and by sex; and occupation, by race and by establishment. The reports examined cover the years 1970 and 1971.[1]

As an outgrowth of this analysis, two separate data bases have been formed. One is an integrated system which brings together elements from several of the encountered sources and makes them available to users. The other is termed a "synthetic" data base. It is synthetic in the sense that data elements from the integrated base are reconciled for inconsistencies and are then unified into one system. This synthetic system can then be updated by using information from sources outside those used to form the original data base (where the element is not annually produced) and by allocating projected labor market aggregates derived from the econometric models that the LMIS staff is developing.[2] Out of this phase of the project it is hoped that statistical procedures for improving the quality and timeliness of encountered data sources will be derived. It is significant to note that one of these new techniques is currently being tested by the Michigan Employment Security Commission using ES 202 and BLS 790 data collected for the Detroit area. From a total systems development perspective, these techniques for improving data base quality are doubly important since the data elements function not only as a direct source of information but also as a sample frame for the generation of other data.

A second task of this project has been to build an econometric model that can be used to forecast employment in local areas in durable and nondurable goods as well as in 16 nonmanufacturing industries, and that will provide estimates of unemployment and labor force size by demographic group. In addition, a simulation model (Simulation of Labor Market Information or SOLAMI) has also been developed to provide a mechanism whereby

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[1] Malcolm H. Cohen, A General Description of the LMIS Project, LMIS Series A1 (Ann Arbor, Mich.: The Institute of Labor and Industrial Relations, The University of Michigan - Wayne State University, 1972), pp. 3-9.

[2] Ibid., p. 7.

forecasts can be tested for their sensitivity to variable and parameter changes.[3]

The third undertaking of the project--and one of the most interesting and important--has been the development of a data retrieval language called MICRO. Certainly one of the most pressing problems to be faced, even if a complete labor market information data set is collected, is how to disseminate the information easily and efficiently to a broad class of clientele with various levels of sophistication. The sheer volume of the material in many cases makes conventional methods of distribution (reports, books, etc.) obsolete.

It remains for the computer and for other new technologies of data storage and retrieval (e.g., microfiche) to solve this dilemma. However, to many and probably most users of these data, the computer remains a mystery, requiring special language arts not related closely enough to English to warrant the effort to learn them. What is needed, therefore, is a form of conversational or semiconversational (structured) English which can be used in conjunction with the computer for data retrieval. The MICRO language, which has been developed as an outgrowth of the LMIS project needs, meets the above specification.[4] It permits users to ask questions about data and receive clarification or definitions of terminology using a highly structured form of English. The most appealing feature is, however, that the user is not required to be sophisticated in the use of the computer to employ it for data access.[5] As this system is tested, developed, and made more flexible, it can function as an important bridge across the gap that now exists between data availability and use; and it can improve significantly the delivery of manpower information services.

The fourth and last task of the project is comprised of seven demonstration projects or experiments aimed at evaluating data needs of CMIS users. These experiments include: (1) the development of a computerized procedure to benchmark ES 202 data with BLS 790 data; (2) an evaluation of the usefulness of LMIS data bases for regional manpower administration; (3) a test of the feasibility of computer-assisted counseling; (4) an

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[3]Malcolm H. Cohen, A Labor Market Information System, a progress report to the Manpower Administration, U.S. Department of Labor, LMIS Series A2 (Ann Arbor, Mich.: The Institute of Labor and Industrial Relations, The University of Michigan - Wayne State University, 1972), p. 16.

[4]For a complete discussion of this system, see William R. Hershey and Carol H. Easthope, A Set Theoretic Data Structure and Retrieval Language, LMIS Series D1 (Ann Arbor, Mich.: The Institute of Labor and Industrial Relations, The University of Michigan - Wayne State University, 1972).

[5]Cohen, A General Description of the LMIS Project, op. cit., p. 4.

analysis of existing data bases to improve unemployment estimates, to expand information on the characteristics of the unemployed, and to assess the possibilities of using these characteristics to design manpower programs; (5) an investigation of the practicability of developing affirmative action data for SMSA's; (6) the development of a better set of indicators of employment service placement activity; and (7) an analysis of the feasibility of developing employer job lists which will, among other things, identify the occupations hired through the employment service.[6] Since these projects have not been completed, there is little more that we can say about them at this time. Instead, let us reiterate how important we feel the research outlined above is for total systems development. It not only provides the key to reliable and detailed information from the encountered system, but also promises to provide a mechanism through which the timeliness and ease of access criteria can be met.

C. The Occupational Employment Statistics Program

As previously stated, a basic ingredient in a comprehensive manpower information system is the occupational identification of various data elements such as employment, unemployment, and labor demand and supply. It has also been noted that a prerequisite to the development of these items is the determination of current occupational staffing patterns for industries and establishments. Currently two options exist for filling this unmet need. The first is to join the federal initiative in providing this information by participating in the Occupational Employment Statistics (OES) program; and the second is to duplicate this effort in the state without joining in the national effort. While there may be some slight disadvantages in cooperating in the broader federal program, we feel that these are greatly outweighed by the advantages which the OES program has to offer. Following is a brief description of the background, goals, design, and division of responsibilities under this program, as well as an estimate from the Manpower Administration of the cost for its basic development in Michigan.

In the fall of 1971 the Manpower Administration, in cooperation with the Bureau of Labor Statistics, launched a new survey program designed to collect statistics on employment by occupation. This survey program represents the results of (1) research efforts conducted by the BLS to find a method for collecting these badly needed data; and (2) the successful experience of the South Carolina Employment Security Commission in conducting a prototype of this survey in that state.[7]

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[6] Ibid., pp. 8-9.

[7] Manpower Requirements and Resources in S.C. Industry and Occupation, Supplemental Report 1971 (Columbia: South Carolina Employment Security Commission, 1971).

A broad range of goals and objectives for the OES program have been set. These include: (1) the development of current data on industry employment by occupation that can serve as a basis for producing estimates of total employment by occupation; (2) the provision of occupational information in a form that can be used for the development and improvement of industry-occupation matrices at the national, state, and local levels; (3) the development of a data base for studies of occupational characteristics among industries, establishments, and processes and the variability of these characteristics over time; and (4) the collection of information necessary for the computation of occupational job vacancy rates in conjunction with the Job Opportunity and Labor Turnover Survey (JOLTS) program.

Because of funding limitations during the first year of operation (FY 1972), only 20 small states (small population) were able to participate in the OES program. Fifteen of these were directly engaged in the first year's sampling of the manufacturing sector while four others began preparations for the second year's sampling of nonmanufacturing establishments, and one--Colorado--began making special provisions for a survey to cover both sectors during one year. In addition, 10 of the participating states were engaged in special research projects designed to refine the techniques used in the program.

The administrative responsibilities associated with this program are divided among the Bureau of Labor Statistics, the Manpower Administration, and the state employment services along the following lines: The BLS has primary responsibility for developing the technical adequacy of the statistical system; assisting through the regional offices the state agency personnel; and preparing various technical program materials for implementation. The Manpower Administration controls the budgetary and administrative aspects of the program, determining in consultation with BLS the personnel resources and funding required for implementation by the states, and the use of data for state and local-area manpower programming applications. Finally, the employment service at the state level is responsible for operation of the program in conformance with the technical specifications outlined by the BLS. Specifically, the duties include: (1)supplementing the national sample to provide coverage sufficient for the preparation of occupational employment statistics for the state and one SMSA; (2) collecting data from the establishments included in the sample; (3) mailing, followup, coding, editing, and transmitting data to BLS (but not printing questionnaires); and (4) participating in response analysis work related to the state as well as to the national OES program.

Several features of the program's design should also be noted. To begin with, it covers only nonagricultural wage and salary employment. The firms to be sampled will be drawn from the universe of unemployment insurance-covered establishments, though for the first survey BLS 790 data will be used. In either case, total employment estimates by occupation

will not be directly provided by this program. Data on occupational employment from the census, departments of licensing, or other such sources will have to be used to reconcile the estimates provided from this program with the total employment figure.

The lead time necessary for complete program implementation is generally considered to be two years, with updating following on a recurrent two-year cycle. However, it is possible that some nonmanufacturing sector sampling will be required during the third year of operation.

Nationally, 50,000 manufacturing and 80 to 100 thousand nonmanufacturing establishments will be contacted. This sample should be large enough to permit some states to estimate directly occupational employment in selected industries from the sample returns. In order to provide complete state and local-area estimates, however, the national sample will have to be supplemented.

For the manufacturing sector, the national sample will generally permit detailed occupational estimates to be made at the 3-digit Standard Industrial Classification (SIC) level. To provide greater accuracy in the estimates, employment data will, wher[illegible]ssible, be gathered and processed at the 4-digit SIC level and then [illegible]l be aggregated upward to the broader classification.

Thirty-three separate industry questionnaires have been designed for use in the first survey. Each instrument contains a list of 80 standard and 40-120 industry-specific occupations. It is anticipated that this will be sufficient to provide national data for over 1,000 occupations. Those areas that are interested in having greater detail than this may, through special provisions of this survey, supplement the basic listing to meet their needs.

Responses to this survey will be coded using an ad hoc occupational classification system designed by the BLS for this program. The system is structurally similar to that of the census; however, it is more detailed at the individual occupation level and is generally convertible to the Dictionary of Occupational Titles classification system and therefore to the U.S. Office of Education codes. The system has three important characteristics: first, it attempts to identify occupations as groups of jobs among which there is a high degree of skill substitutability; second, because the data produced by this program will be used for educational planning purposes, emphasis is given to occupations requiring substantial periods of training or special education; and third, it groups together large numbers of occupations which are not differentiated in terms of training or educational requirements but which, for the most part, can be entered with a minimal amount of on-the-job training.

The preceding paragraphs have described the characteristics of the federal OES program and have indicated some of the possible options that are available to the participating states. There remains, however, the question of cost. Under the present administrative arrangements, states chosen to participate do not incur any cost for the development of the program outlined above. Costs that are not covered by this arrangement are those associated with supplementation of the sample or the occupation lists to provide greater detail for the states and local areas.

Since the program parameters have not been set, we cannot provide estimates of the total development costs for Michigan at this time. We can get some rough idea of their magnitude, however, by looking at the labor cost estimate for the basic program that has been prepared by the Department of Labor. The Manpower Administration assumes that, for the unsupplemented program to be developed in Michigan, the Employment Security Commission would need to add six full-time staff to its research division. The cost associated with doing this is estimated to be roughly $100,000 per year. While this is significant, it should be remembered that if Michigan were a participating state in this program, federal financing would cover this cost. In addition, we would speculate that while expansion of the program through sample and occupational-list supplementation would raise the total cost of the project, it would do so less than proportionately to the amount of the extension. We are hypothesizing, in other words, that a 25 percent increase in total program costs could result in a 35, 40, 50, etc. percent increase in industry and occupational coverage.

D. Occupational Requirements Information

One of the identified priority data needs is the development of projections of occupationally specific labor market requirements for the state as well as for local areas.

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At this point it seems wise to explain that the estimates of future labor requirements by occupation to which we are referring in this section should not be confused with the economist's concept of the demand for labor. Although the distinction between the two is straightforward, it has not always been identified in the literature; and often the terms have been used interchangeably. In this report we shall distinguish between them and hopefully thereby avoid confusion and misrepresentation of the results which the techniques discussed here provide.

Labor requirements, as defined in this context, refer to the amount of labor needed to achieve given employment objectives or standards. For example, if it is known that in the future educators wish to reduce the student-teacher ratio and it is known approximately what the enrollments

will be, estimates of the number of teachers required to achieve the desired goal can be made. It should be clear, however, that this number will not necessarily correspond to the number of teachers who will be offered employment at prevailing salary scales. The requirements concept is, therefore, technological rather than economic in nature.

The demand for labor, on the other hand, is a functional relationship that relates the quantity of labor which employers are willing to hire (the dependent variable) to the prices or wages and salaries (independent variable) that are paid for these quantities in the marketplace. In addition, the demand for labor is distinguished by the fact that it is a "derived" demand and as such its future characteristics will depend on a number of factors related to the employers' overall production decisions. Paramount among these are: (1) changes in the level and composition of final demand for the goods and/or services that the employers produce; (2) the introduction of new technologies into the production process; (3) the elasticity of substitution between the inputs used; (4) changes in interindustry demand for intermediate goods; and (5) changes in relative prices of the factors themselves.

As the astute reader will surmise, in the process of estimating the future demand we cannot simply rely on one variable as a basis for making projections. Each variable is capable of significantly altering employment decisions in future time periods and therefore needs to be incorporated in the forecasts if the figures are to be complete. Unfortunately, because of the uncertainty surrounding the correct anticipation of these changes (due in a large measure to the current state of the art associated with making projections), the effort required to produce these demand forecasts is seldom made. Nevertheless, we should not lose sight of the fact that it is the demand figures, and not the requirements, that are needed when decision-makers are looking at future market conditions as a basis for making policy decisions. It is only when the relative factor prices remain constant, when the techniques of production are anticipated to remain unchanged, and when economic growth is anticipated to continue that the requirements forecasts can be considered as acceptable substitutes for their counterparts.

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Within the past decade several new techniques have been developed by the Bureau of Labor Statistics to meet this need for the development of requirement projections with what appears to be a reasonable degree of accuracy. These techniques have been described in the bureau's publication Tomorrow's Manpower Needs (TMN). The initial four volumes of this report provide information on (1) the impact of national developments on employment requirements by industry and occupation; (2) the results of research on the growth and changing composition of the population and of the labor force; (3) the relative growth expected in various industries; (4) the

effect of technological change and other economic factors on industry employment; (5) the occupational structure of selected industries in 1960; (6) patterns of working life; and (7) several techniques for using this information to make the desired projections. We do not intend to reproduce this information in its entirety here. Instead we shall discuss in general terms what the approaches outlined in this publication entail and what additional developments have taken place since their introduction.

Fundamental to an understanding of the TMN techniques and their limitations is a knowledge of those factors which contribute to future occupational growth. By and large, these can be grouped into three classes: (1) those factors contributing to industry employment growth; (2) those which produce changes in the occupational mix; and (3) those causing job vacancies. Each of these will now be discussed in slightly more detail.

Because each industry has a unique occupational structure as a result of the particular technology it employs, the future employment level of the industry is a primary determinant of occupational requirements. Given this technology, these requirements will grow as the output of the industry is increased in response to new demand for its goods and/or services.

Unlike the national economy,which can be treated almost as a closed system, the states and substate areas can experience an increase in industry employment and therefore occupational requirements from another source. Take, for example, the case where plants located in one state or region of the country move to or relocate in another. From a national viewpoint these movements have no impact whatsoever on total occupational requirements because the loss of a given number of jobs in one area is offset by the gain in employment in another. However, the states and local areas do not share in this equilibrating effect. From their standpoint the movements can be interpreted in terms of either an absolute decline or an increase in employment opportunities and therefore occupational requirements.

The second factor influencing the size of future requirements is the change in the occupational distribution of employment within an industry. These changes come about for a number of reasons, some of the most important of which are: (1) the introduction of new technology by firms in the production of goods or the provision of services; (2) the development of new services or products in an industry; and (3) the reaction of employers to anticipated or realized relative factor price changes, which makes factor substitution cheaper than continuing with the existing occupational mix.

Finally, some persons now employed in each occupation will, as time passes, be fired, die, retire, leave voluntarily to take the same kind of job in a different geographic area, or seek employment in another occupation. As a result, future occupational requirements will depend at least in part upon the number of vacancies created by these sources.

In TMN, the Bureau of Labor Statistics suggests two techniques for estimating future requirements caused by growth in industry employment. Both rely on the assumption that states and local areas will follow national staffing trends and use an industry-occupation matrix to translate projections of employment into occupational requirements.

Method A integrates the national matrix developed from the 1960 census data and the projected 1975 matrix directly into the state and local-area projection scheme. Its application is essentially mechanical and entails the following six steps: (1) estimation of current industry employment for the target area and projection of totals to 1975; (2) application of the 1960 industry-occupation matrix to the industry employment vector to determine current occupational employment; (3) application of the 1975 matrix to the projected industry employment vector to determine estimates of occupationally specific employment in 1975; (4) calculation of change factors for the corresponding cells in the two matrices; (5) acquisition of an independently arrived at set of industry-occupation employment estimates for the base period; and (6) application of the change factors desired in step four to the occupational distribution obtained in step five.

Method B is a considerably more complex and costly approach to making these estimates than is Method A. The reason for this is its reliance upon the independent development of a special base-period matrix for the target area. Once this has been completed, however, the derivation of the 1975 employment estimates becomes quite routine. It requires essentially the completion of the following four tasks: (1) projection of industry employment to 1975; (2) transformation of the base-period matrix coefficients to their 1975 counterparts by application of cell-change factors developed by the BLS; (3) development of occupational employment estimates by industry through the application of the projected matrix to the total employment vector estimated in two above; and (4) determination of the total 1975 occupational requirements owing to industry growth and technological change by summing the separate industry estimates developed in the previous step.

Occupational employment projections developed through the use of relatively mechanistic systems such as those offered by Methods A and B, while useful to analysts, are not without their shortcomings. For example, we have already noted that the TMN techniques account solely for new vacancies attributable to anticipated industry growth and technological change. However, these can only be considered as one component of the total future requirements. To complete the estimates, the number of vacancies resulting from attrition among employed workers needs to be estimated and added to the TMN totals for the projection period.

Other criticisms have been directed at the Tomorrow's Manpower Needs technique as a tool for state and local-area planning. The target of many

of these criticisms has been the implicit TMN assumption that regional staffing patterns reflect the national averages appearing in the 1960 and 1975 matrices. While Method B is an improvement in that it accounts for local-area employment in the construction of the base-period matrix, the application of national change factors to these coefficients results in much the same problem. Another criticism of the TMN approach has centered on the matrix itself. Specifically, with only 116 industries and 162 occupations, the detail provided has not been sufficient to suit the needs of most users. The limited occupational coverage, for example, has resulted in the exclusion of all so-called low-skill jobs from the TMN matrices.

Because of the Bureau of Labor Statistics' recognition of the shortcomings associated with the use of the national matrix for state and local-area requirements projections, it has begun a three-year program to develop an integrated national-state industry-occupation matrix system. The objective of this program, which is being run in conjunction with the Manpower Administration and the state employment service offices, will be to provide for each state, the District of Columbia, and selected SMSA's an industry-occupation matrix consistent in format, coding structure, employment concepts, etc. with the BLS national matrix.[8] In addition, the BLS will also design and develop a flexible multipurpose computer system that will enable the recipient to utilize these matrices in their operational and research programs.

The matrices will be constructed by the BLS from data gathered in the 1970 Census of Population. Each will contain staffing patterns for 220 detailed industries and will provide employment information for 425 separate occupations in six worker classifications. Data elements provided for each occupation will include: (1) name; (2) total employment; (3) percent of total industry employment; (4) total private wage and salary employment; (5) percent of private wage and salary employment in total industry employment; (6) government employment at the federal, state, and local levels; (7) number of unpaid family workers in each industry; and (8) number of self-employed workers in the industry. These matrices, along with the technical users packages, should be available by the fourth quarter of calender year 1973.[9]

The responsibilities for program implementation are divided among the participating agencies in roughly the same fashion as they are under the OES and JOLTS programs. The BLS has been delegated the responsibility for

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[8]"National/State Industry-Occupation Matrix Program," Reports and Analysis Letter to all State Employment Security Agencies (Washington: U.S. Department of Labor, Manpower Administration, [FY 1972]), p. 3.

[9]"Proposed Schedule for National/State Matrix System" (Washington: U.S. Department of Labor, Bureau of Labor Statistics, [FY 1972]), p. 3.

the technical development and the maintenance of the statistical adequacy of the matrix system. In addition, it will provide technical assistance to state employment service personnel on subjects such as matrix content and applicability, data processing systems, and projection techniques. These services will assure that a high level of technical adequacy is maintained in the collection and analysis of the data and that comparable methodologies are used in making employment estimates and projections among the states.

The Manpower Administration has responsibility for the coordination of the program, including its administrative and budgetary aspects. Among its specific duties are to determine personnel requirements and funding levels for program implementation and to provide guidance in the use of these resources to the state employment services.

The employment services will be responsible at the state and local-area level for operation of the program in conformity with the guidelines set by the Manpower Administration and the BLS. In addition, the state employment services will be responsible for assessing their own capabilities to process the matrix data. Based on this evaluation, the states will determine the volume of assistance which they will require from the Manpower Administration to forecast future requirements using the basic methodologies developed in the TMN series.

A six-digit code will be used to classify the separate industries in the matrix and will, whenever possible, include the Standard Industrial Classification taxonomy. Occupations appearing in the matrix will be coded using an eight-digit BLS classification system. This has been designed to accommodate all occupational levels and is structured so that gaps in the present coverage can be filled without disturbing the basic classification system. Conversion of these data to other coding structures remains a problem, however, since the BLS and census codes are not strictly comparable. In an effort to solve this problem, the BLS is working on a translator that will permit the conversion of these data to the Dictionary of Occupational Titles and Office of Education coding systems.

One deficiency of the TMN system is that it relies on a matrix developed from data collected in 1959 and reported in the 1960 Census of Population. As a result, the staffing patterns were at least 10 years old by the time the approach became widely available for use by the states. While this may not be critical in those industries where the pace of technological change has been slow, in others where it has rapidly progressed the staffing patterns will have uncertain value for current use. In anticipation of this same problem with the 1970 census data, the BLS has designed the industry-occupation matrix and the OES programs to interface. States participating in both programs, therefore, will have the capability to update the decennial matrices on a 24- to 36-month cycle.

VII. RECOMMENDATIONS

In this report the Institute has sought to provide some fresh perspectives on the issues surrounding the question of the need for a manpower information system in Michigan. We began with a broad conceptual definition of what we think a comprehensive manpower information system is, discussed the question of "need," and finally considered some ways in which unmet needs could be resolved. As the reader is well aware, we have taken a general approach to this task, preferring to cover a broad spectrum of topics and ideas rather than to study intensively just a few. While we feel that we have been successful in fitting the pieces together so that planners and administrators can view their problems in relation to the needs of all users, we recognize that our discussion leaves gaps. The cost information we were able to assemble, for example, is woefully inadequate for analytical purposes. Moreover, we have not looked at any of the ways in which the encountered system should be or can be improved.

Further research on these items will no doubt be needed before a complete ranking of the elements identified in this report can be considered. While research on these topics is important, we are not satisfied just to suggest that more studies be undertaken. The longer a unified effort is postponed in the state, the greater the resource waste will be as users try to meet similar needs with ad hoc and fragmented solutions. We believe that implementation of the recommendations listed below will lead to a situation preferable to the one which now exists. We cannot and will not state, however, that these are the only solutions available. Consequently, even if these are not implemented, the Institute will be satisfied as long as a unified effort results to solve the labor market information problem.

Throughout this report we have tried to emphasize that an inefficient utilization of resources occurs when myopic and disjointed efforts are employed to develop labor market information. We have also stressed that a unified and centralized effort can not only achieve certain economic efficiencies, but would also introduce some badly needed consistency into a comprehensive system. It has been further noted that while the implementation of a total labor market information system may necessarily be the product of an evolutionary process covering a number of years, to be truly comprehensive this evolution must be guided by an explicit and deliberate plan. Furthermore, this plan should come as closely as possible to meeting the needs of all users of an information system. Finally, we have tried to show that the development and maintenance of a comprehensive system represents a job too big, costly, and important for any one agency to undertake. For these reasons the Institute recommends that:

1. A consortium agreement be drawn up for all agencies and parties interested in the development of a labor market information system

and in the improvement and extension of manpower and educational services. This agreement would not only provide sanction and authority for a centralized effort but would also detail administrative, program, and financial responsibilities of the participants.

2. All participants in this consortium adopt as a working goal the development of a comprehensive and rationalized labor market information system for Michigan.

3. The State Office of Manpower Planning and the Michigan Employment Security Commission collectively assume administrative responsibility for the organization and maintenance of this consortium arrangement and for the preliminary design of the total system.

4. A standing committee for the development of a labor market information system be formed from "high-level" representatives of the agencies and interests participating in the consortium and be incorporated into the Michigan manpower structure. This committee would be responsible for the ultimate design and implementation of a comprehensive system; the setting of development priorities; the monitoring of the system's use; and the maintenance of a quality effort throughout the state.

5. The Michigan Employment Security Commission, because of its extended involvement in the provision of labor market data and because of its ready access to information required for development, serve as the operations coordinator. As such, this agency should have primary responsibility for the organization of information-gathering efforts, data processing, storage, analysis, and distribution.

6. A small technical advisory and evaluation committee comprised of representatives from MESC, the university system, private research organizations, and the business sector be organized. This group would be directly responsible to the standing committee and would be retained on a fee-for-service basis. Its functions would be: to provide technical evaluations of the encountered data bases as well as of the proposed system; to review periodically the total system to assure quality in the maintenance of effort; to study new technologies for the improvement of service delivery and the feasibility of implementing these technologies in Michigan; and finally, to provide a source of technical expertise for the operations coordinator. Technical committee evaluations would be made available to all participants in the consortium and recommendations for alterations in the system would be directed to the standing committee for action.

As part of this report the Institute has also tried to identify some priority areas where it feels immediate action should be taken to meet needs. Programs have also been identified that are congruous with a "total system" concept and that would satisfy current priorities if implemented. However, before any new programs are undertaken, agreements on the level of geographic detail at which the data are to be provided must be reached. This problem is complicated by two factors. First, the techniques which are used to provide the information may not be compatible with the level of disaggregation which is considered optimal or even preferable. Second, the greater the degree of disaggregation, the larger the costs associated with data collection.

While we cannot suggest one particular configuration at this time, we do recommend that one of the first orders of business of the standing committee be the designation of boundaries for labor market information areas. To aid in this decision, the Institute has outlined in Appendix C several alternative areas that would warrant a regional designation in terms of population size and socioeconomic characteristics.

With respect to program priorities that have been identified, the Institute recommends that:

1. Representatives of the State Office of Manpower Planning and of the Michigan Employment Security Commission meet in Washington with officials of the Manpower Administration to express Michigan's interest in becoming the first large state (in terms of population) to participate in the Occupational Employment Statistics program.

2. The consortium make immediate arrangements for the preparation of projections of occupational requirements for each labor market information area with no less than a three-year lead time, using the 1970 census and industry-occupation matrix, and following the general techniques specified in the publication Tomorrow's Manpower Needs.

3. Projections of future occupational requirements be provided annually for each region using information gathered from the OES program to update the respective industry-occupation matrices.

Finally, a number of local-area data users and especially direct intermediaries have expressed a desire to have future occupational requirements data for very small geographic areas and for relatively short lead times (1-2 years). The fact that a methodology does not now exist to satisfy these needs is well known. Therefore, until the state of the

art is advanced to the stage where large-scale, uniform projections on this basis can be made, the Institute recommends that:

1. Local-area data users combine to provide a unified organization for the collection of data elements from the encountered system. These data can serve as indicators of short-run labor market trends. Techniques such as the "industry-expert" approach, "leading indicators" approach, and the "area skill survey" could be used for this purpose.

2. The State Office of Manpower Planning act as a coordinating agency for these localized efforts. As part of this function, it should provide technical assistance in the implementation of techniques, such as those mentioned above, and assist in the interpretation of these results and their relationship to longer term, areawide projections.

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Wisconsin State Employment Service. Project Vision. Madison: Wisconsin Department of Industry, Labor and Human Relations, 1970.

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APPENDIX A

DIRECTORY OF LABOR MARKET INFORMATION

Sources of National Information

RECURRENT REPORTS

Advance Statistics on Opening Fall Enrollment in Higher Education--Basic Information. U.S. Office of Education. This survey is carried out by mail questionnaire and lists enrollments by sex and student status for each state for both public and private colleges and universities.

American Science Manpower. National Science Foundation. Biannual. This publication relates detailed characteristics on employment and earnings for American scientists.

Area Trends in Employment and Unemployment. Manpower Administration, U.S. Department of Labor. Monthly. This publication provides data on numbers in the work force, employment, and unemployment.

Business Statistics. U.S. Department of Commerce, Office of Business Economics. Biannual. This report supplements the Survey of Current Business. It contains a section on the labor force, employment, and earnings; historical data on these items usually date back to 1939.

Current Federal Workforce Data. U.S. Civil Service Commission. Biannual. The latest release of this report was in January 1970; it is based on the June 1968 data. It covers a selected sample of 154 federal white-collar occupations, representing about 95 percent of the total federal white-collar work force.

Digest of Educational Statistics. U.S. Office of Education. Annual. This publication details information including school enrollments, number of teachers, income of schools, and graduates by level of education.

Earned Degrees Conferred--Part A. U.S. Office of Education. Annual. This publication lists graduates by level, school, and sex; and it has some aggregate data by state on individual fields of graduates.

Earned Degrees Conferred--Part B. U.S. Office of Education. Annual. This publication lists number of graduates and degrees conferred for each individual institution.

Education and Training--A Chance to Advance. U.S. Office of Education. Annual. This report is a narrative and statistical review of the accomplishments of the Manpower Development and Training Act (MDTA). Its data elements include characteristics of the trainees, labor force status of those completing the program, and program enrollments.

Employment and Earnings. U.S. Bureau of Labor Statistics. Monthly. This report regularly carries statistical tables (set "A") on the occupational background of persons in the nation's labor force, both those employed and those unemployed. Some tables present a current picture; others show change over time. In some of the tables the data on occupational background are cross-classified with other characteristics such as age, sex, color, and full-time versus part-time job status.

Employment and Earnings Statistics for the United States. Bulletin 1312. U.S. Bureau of Labor Statistics. Annual. This bulletin summarizes employment and earnings data for production workers on a national basis. Historical series for most elements are provided back to 1939.

Employment and Earnings Statistics for States and Areas. Bulletin 1370. U.S. Bureau of Labor Statistics. Annual. Provided in this publication are summary data on employment and earnings for production workers at state and local-area levels. Historical series for many elements are supplied back to 1939.

Federal Civilian Employment in the U.S. by Geographic Area. U.S. Civil Service Commission. Annual. This report provides data on employment by state, county, pay system, and selected agency, as well as by Standard Metropolitan Statistical Areas.

Federal Workforce Outlook 1969-72. Annual. This report looks at projected federal work force figures for a four-year period. It has projected federal employment by occupation for 154 occupational series, which represent 95 percent of the total federal white-collar work force.

Handbook of Labor Statistics. U.S. Bureau of Labor Statistics. Annual. This publication relates employment, unemployment, earnings, and the general characteristics of the labor force. It is a summary of many of the BLS works. It uses such files as the Current Population Survey, Urban Employment Survey, BLS 790, BLS (or BL) 1219, industry surveys, and union wage surveys; it also gives information about prices and productivity.

Manpower Report of the President. A Report on Manpower Requirements, Resources, Utilization, and Training. U.S. Department of Labor. Annual. In the Statistical Appendix, this report has tables on occupational employment and textual discussion relating to current and prospective developments in occupational and professional employment.

National Survey of Professional, Administrative, Technical, and Clerical Pay. U.S. Bureau of Labor Statistics. Annual. This publication provides results of an annual nationwide survey of salaries for selected white-collar occupational groups. It includes salary trend data from 1961, survey methods, scope, and occupational definitions.

Occupational Outlook Handbook. U.S. Bureau of Labor Statistics. Biennial. There is no statistical information in this publication, but it is a comprehensive volume examining different occupations, the nature of the work, training, employment outlook, and sources of other information.

Occupational Outlook Quarterly. U.S. Bureau of Labor Statistics. This report provides current information on employment trends and outlook, supplementing and updating the information in the Occupational Outlook Handbook.

Preliminary Statistics of State School Systems. U.S. Office of Education. Annual. This publication lists enrollment, instructors, expenditures, graduates, and money receipts from the government for each particular state.

Students Enrolled for Advanced Degrees--Summary Data. U.S. Office of Education. Annual. This report contains data on enrollments in various courses from a national survey of colleges and universities.

Unemployment Insurance Statistics. Manpower Administration, U.S. Department of Labor. Monthly. This report carries several tables showing the occupational attachment of the insured unemployed. The occupational data are given primarily in terms of major occupational groups.

Vocational and Technical Education--Annual Report. U.S. Office of Education. This report provides a compendium of statistics related to vocational education compiled from individual state reports. The most recent report is for fiscal 1969.

INTERMITTENT REPORTS

Dictionary of Occupational Titles. 3d edition. Vols. I and II. Manpower Administration, U.S. Department of Labor. 1965. Volume I of this edition contains an alphabetical listing of occupational descriptions and job classification codes. Volume II contains occupational categories and occupational groups arranged by title and code; worker-trait arrangements of titles and codes; and an industry arrangement of titles. The Supplement to Volume I of the third edition lists individual physical demands, working conditions, and training-time data for each job defined in the Dictionary.

Indexes of Output Per Manhour. Selected Industries 1939 and 1947-1970. U.S. Bureau of Labor Statistics. 1972. This publication develops a historical series of output per manhour for selected mining, manufacturing, rail, air transportation, gas, and electric utilities industries.

Industry Wage Surveys. U.S. Bureau of Labor Statistics. These surveys are conducted by the Bureau and are published in bulletin form. The Bureau describes these surveys as follows:

> Averages and distributions of hourly wage rates for representative occupations--nationwide, region, selected areas; size of establishment and other characteristics, depending upon industry and whether studied nationwide or in selected areas only. Scheduled hours, supplementary benefits, and special analyses.
>
> Coverage: 50 manufacturing and 20 nonmanufacturing industries. About 15 industries studied each year, some in selected localities only, but most on nationwide basis.

Job Patterns for Minorities and Women in Private Industry: 1966, Parts I, II, and III. 1968. U.S. Equal Employment Opportunities Commission. This report is based on the EEO-1 form submitted by employers. Volumes I and II contain information on the employment of minority groups and women for the nation and for the individual states. Volume III provides similar information for individual Standard Metropolitan Statistical Areas in the United States.

Vocational Education and Occupations. U.S. Office of Education. 1969. This publication provides a cross-classification between the DOT (Dictionary of Occupational Titles) occupational codes and the vocational education occupation classification system. It is a reversible index.

SPECIAL STUDIES

Occupational Employment Statistics, 1960-1970. Bulletin 1738. U.S. Department of Labor, Bureau of Labor Statistics. 1972. The preface to the bulletin describes its contents as follows:

> This report brings together information on employment by occupation from many sources to provide a handy reference volume to users of such data. It presents national occupational estimates by industry for the 1960-1970 period derived from a variety of sources,

including surveys conducted by the Bureau of Labor Statistics, Bureau of the Census, National Science Foundation, Office of Education, Interstate Commerce Commission, Federal Communications Commission, and data provided by many professional associations.

Outlook Studies for Specific Occupations and Professions. Special outlook studies, showing projected future requirements, are issued from time to time by the Bureau of Labor Statistics, by other federal agencies, and by private groups. Such reports are listed regularly in the reference sections of such Department of Labor publications as The Monthly Labor Review and Manpower. BLS outlook reports are listed also in the cumulative semiannual catalog.

Tomorrow's Manpower Needs. U.S. Bureau of Labor Statistics. 1969. This gives percentage figures on industry employment by occupation and occupational distribution by industry for 1960, and projected for 1975. The 1960 figures are based primarily on census data.

OCCUPATIONAL DATA PROGRAMS UNDER DEVELOPMENT

The Job Opportunity and Labor Turnover Survey (JOLTS). In this survey the coverage of the job vacancy reporting program of the Bureau of Labor Statistics is being expanded to include nonmanufacturing industries as well as the manufacturing industries now covered. Job vacancy data by occupation will ultimately be provided.

Sources of Michigan Information

RECURRENT REPORTS

Active File Characteristics by Occupation Code. Michigan Employment Security Commission. Quarterly. This printout, produced under the Employment Service Automated Reporting System (ESARS), is provided for each branch office. It shows the number of persons registered for work with MESC by occupational background cross-classified against other characteristics (age, sex, race, and educational attainment). Persons registered for work include unemployment insurance claimants (who must register) and other persons seeking jobfinding assistance. However, many jobless, especially those in professional and technical fields, do not use the employment service.

Area Wage Surveys. U.S. Bureau of Labor Statistics. Annual. These surveys are conducted by the Bureau, and results are published for 90 different labor market areas in the United States under the above title in bulletin form. The Detroit and Muskegon-Muskegon Heights SMSA's are included in the areas covered. The type of data provided include "Averages and distributions of wage and salary rates for office clerical, skilled maintenance, custodial and material movement jobs--area-wide and by industry group . . . . The 76 occupational categories studied include 31 office clerical; 15 electronic data processing, drafting, and industrial nurses; and 30 maintenance, toolroom, power-plant, and custodial and material movement jobs."

Michigan Employment Security Commission Annual Report. MESC. Annual. Although the commission's latest annual report, covering fiscal year 1971, does not show any occupational data, this document could become a source document for such information as occupational data become available from programs underway. The report for fiscal year 1970 provided data on MESC statewide placements by major occupational group.

Michigan Inventory of Job Openings. Michigan Employment Security Commission. Monthly. This report represents a statewide listing of job orders, by occupation, that cannot be filled by the branch office taking the job order. The listing is not necessarily a complete one since it is optional with branch offices to refer hard-to-fill job orders to the state office. The December 1972 report lists 136 job openings in 36 occupations.

Michigan Labor Supply and Demand Summary. Michigan Employment Security Commission. Monthly. This report provides a listing, by branch offices, of occupations for which there is a local shortage of job applicants and of occupations for which there is a local "good supply."

Unemployment Insurance Statistics. Manpower Administration, U.S. Department of Labor. Monthly. This report carries one statistical table (Table 36) showing the occupational attachment of the insured unemployed for states, including Michigan. The data cover selected occupational groups.

Union Wages and Hours. U.S. Bureau of Labor Statistics. Annual. This report represents the results of an annual survey covering union wage rates and hours for selected occupations in the following four industries: building construction, local transit, local trucking, and printing. Detroit and Grand Rapids are included in the 68 cities covered by the annual survey.

Union Wage Scales, Building Trades. U.S. Bureau of Labor Statistics. Quarterly. This report provides the results of a quarterly survey of union wage rates in seven major building trades in 100 cities, including Detroit, Grand Rapids, and Lansing.

INTERMITTENT REPORTS

Industry Wage Surveys. U.S. Bureau of Labor Statistics. Although the results of these industry surveys are generally provided on a nationwide basis, it is possible that a review of the surveys would disclose that reports for some industries (such as the motor vehicle industry) show data for Michigan (the state and/or certain SMSA's).

Report on Employer Job Orders in MESC Job Bank. Michigan Employment Security Commission. This printout, prepared only for the Detroit SMSA, is a summary of job orders and placements by occupation based on the commission's Job Bank program. Discussions are underway relating to obtaining a breakout of data for Detroit. The report is apparently not being released on a regular recurrent schedule.

SPECIAL STUDIES AND REPORTS

Guide to Local Occupational Information. U.S. Department of Labor, Manpower Administration. Third edition, 1969. 144 pp. The preface to the report states:

> This publication is a directory of selected state employment services' studies intended to provide current local occupational information for use in designing training programs, for counseling in local public employment offices and schools, and to offer individual job opportunities in specific occupations or groups of occupations.

Part III of the report lists a number of occupational guides issued by the Michigan Employment Security Commission. However, most of the guides listed were issued in the early sixties or in the fifties and thus do not represent current information concerning the occupations discussed.

Michigan Manpower Study--An Analysis of the Characteristics of Michigan's Labor Force in the Next 15 Years. Michigan Employment Security Commission. November 1966. 108 pp. This comprehensive study, carried out by the Battelle Memorial Institute, was sponsored by MESC, the Michigan Department of Education, and the Michigan Department of Commerce. The report includes a presentation of projected 1980

employment in 45 selected occupations, for Michigan and for the Detroit SMSA. The current usefulness of the projections is impaired because they are based largely on occupational data from the 1960 census.

OCCUPATIONAL DATA PROGRAMS UNDER DEVELOPMENT

The Job Opportunity and Labor Turnover Survey (JOLTS). Since the Michigan Employment Security Commission is participating in this program (listed under Section A-4), it is possible that job openings data for occupations in both manufacturing and nonmanufacturing industries will ultimately be available for the state as a whole and perhaps for smaller areas.

The 1970 Industry-Occupation Matrix. This program under the sponsorship of the Bureau of Labor Statistics and the Manpower Administration provides a detailed industry by occupation matrix for each state. The data used to prepare this matrix comes from the 1970 Census of Population. This matrix replaces the one reproduced in Tomorrow's Manpower Needs prepared from 1960 census data.

National, State, and Local-Area Data

From the U.S. Bureau of the Census

Census of Business: Retail Trade, Major Retail Centers, United States, Series BC-MRC. This report is compiled every five years; the most recent release is for 1967. It has payroll information for the entire year and numbers of paid employees for the week, including March 12, by kind of business in the central business district. It has state, SMSA, city, and central business district detail for cities over 100,000 in population. Also published for Michigan.

---- Selected Services, Area Statistics, United States Summary, Series BC-SA. This report is compiled every five years; the most recent release is for 1967. It has payroll information for the year and paid employees for the week of March 12, 1966, by kind of business. It has state, SMSA, county, and city detail. Also published for Michigan.

---- Wholesale Trade, Area Statistics, United States Summary, Series BC-WA. This information is gathered every five years, the most recent release being 1967. It has payroll data for 1966 and the first quarter of 1967, giving paid employees for the week of March 12, with state, SMSA, county, and city detail. Also published for Michigan.

Census of Governments: Compendium of Public Employment. This report is compiled every five years, the latest edition being 1967. It has detailed data on employees and payrolls of federal, state, and local governments. It includes average monthly earnings of full-time employees.

Census of Manufactures: Area Statistics, United States Summary. This report is compiled every five years; the most recent release is for 1967. It has industry statistics for geographic divisions, states, SMSA's, counties, and cities. It contains employment with industry detail, as well as aggregate manhours and wages. There is also an Annual Survey of Manufactures containing sample data.

Census of Population: 1970, Detailed Characteristics, Michigan, PC(1)-D24. 1972. This report provides detailed occupational information through extensive cross-classifications. The information is available in varying degree for the state, SMSA's, and large cities.

---- [1970], Detailed Characteristics, United States Summary, Final Report PC(1)-D1. This report has not yet been released. It will carry detailed data on occupational employment and earnings for the country as a whole.

---- 1970, General Social and Economic Characteristics, United States Summary, Final Report PC(1)-C1. 1972. As indicated by the Table Finding Guide on page ii of the report, information is presented on occupation of employed persons, last occupation of the experienced unemployed, and 1969 median earnings (for selected occupational groups).

---- 1970, 10B, State Economic Areas, PC(2). 1972. The Bureau of the Census Catalog, January-September 1972, states:

> This report presents statistics . . . [on] . . . the inhabitants of each of the 510 State economic areas (SEA's). The report represents a consolidation of selected tabulations published for counties in the PC(1)-C series of reports for the various States.
>
> Data cover the total population, the Negro population, persons of Spanish heritage, and the rural population, and provide statistics on general, social, and economic characteristics; employment and industrial characteristics; educational and family characteristics; and occupation and income.

Census of Population and Housing: 1970, Census Tracts, Series PHC(1). The census tract reports have been issued for each SMSA in Michigan. Several of the tables provide an occupational breakdown of employed workers, by tract.

---- 1970, Employment Profiles of Selected Low-Income Areas, Detroit. PHC(3)-22. According to the Bureau of the Census Catalog, January-September 1972, the report presents detailed socioeconomic data on employment-related problems in this selected urban area. Statistics are presented for employment and unemployment, education, vocational training, job history, income, residential migration, and factors which are problems in job holding or job seeking for the residents of this area.

City Employment in 1971, Series GE71-No. 2. April 1972. This is an annual report of sample data on full-time employment and average full-time earnings on a monthly basis for metropolitan areas.

Public Employment in 1971, Series GE71-No. 1. April 1972. This is an annual report of sample data on public employment and payrolls of federal, state, and local governments by function for each respective government. It has average earnings for state full-time employees, as well as some state and local detail.

APPENDIX B

COMPONENTS OF A COMPREHENSIVE MANPOWER INFORMATION SYSTEM[1]

Component 1. Locational and Identifying Information by Establishment

1. Definition. The information from this component will enable the user to locate individual establishments by address of worksite, to identify the employer at that worksite by the Standard Industrial Classification (SIC) code, and to contact the appropriate individual at the hiring point.

2. Adequacy of the encountered system. Current locational information is considered inadequate for the following reasons: (1) no identifying information is available for establishments of 10 or fewer workers; (2) mailing address of the establishment may be a corporate address outside the area or state; (3) no addresses are available for the worksites of multiples having more than one branch within a county nor is there any indication of the amount of employment by worksite; (4) no means are available for identifying employers outside the unemployment insurance system; and (5) the local establishment card is not "cleanly edited" (establishment employment is not distributed to within-county worksites).

3. Output. This component must serve two purposes: (1) delivery to the users of directory-type information for the identification of individual firms and (2) provision of establishment employment information that can be aggregated to estimate total employment in specified areas.

4. Costs. First year, $33,000 for setting up program and putting it into operation; second year and subsequent years, $17,000.

Component 2. Establishment Employment by Industry

1. Definition. The information provided by this component will enable the user to maintain a continuing employment series for an identified employer. Disaggregated, the monthly employment figures will show the size of the establishment, fluctuations in its employment, and longer term patterns of expansion and contraction. Aggregated, these data afford the capability of distributing by industry the employment in any specified area in the form of a time series.

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[1] Margaret Thal-Larsen, with Stephen Laner and Donald Mayall, Requirements and Design of a Labor Market Information System for a Large Metropolitan Area, preliminary draft (Berkeley: Human Factors in Technology Research Group, Department of Industrial Engineering and Operations Research, University of California, May 1, 1972), pp. 4-1 through 4-200.

2. Adequacy of the encountered system. No method now exists for mechanically providing this information in a form that is convenient for use and for a sizable number of establishments or a selected group of establishments.

3. Output. The primary purpose is to provide a ready means for delivery of monthly employment data for selected establishments.

4. Costs. $1,000 annually for data processing and miscellaneous.

Component 3. Establishment Employment by Occupation

1. Definition. This component relates to the occupational distribution of the total employment of an identified employer. In conjunction with Component 1, Component 3 will provide an occupational breakdown of employment for the same month that the employer locates and distributes his employment by worksite. Aggregated, these data afford the capability of distributing by occupation the employment in any specified area within which a representative sample of employers is polled.

2. Adequacy of the encountered system. Managers of private and college employment agencies were content with their capabilities for determining the occupational profiles of the establishments in their areas. Public agency managers, however, considered their placement efforts handicapped for lack of knowledge about the markets they were seeking to penetrate.

3. Output. The principal output will be hard copy showing the reported occupational distribution of employment for single establishments.

4. Costs. First year, $170,000, which includes initial collection of data from the firms, assigning occupational codes, developing computer programs, keypunching, computer time, and miscellaneous; subsequent years, $74,000.

Component 4. Establishment Potential for Employment of Special-Worker Groups by Occupation

1. Definition. Component 4 will provide information on the general characteristics of the workers being hired in identified establishments and on certain of their specific characteristics. It will also include an evaluation of referral experiences.

2. Adequacy of the encountered system. Managers of California Human Resources Development (HRD) offices complained that the time permitted them was insufficient to identify local employers in terms of the occupations for which they hired and then to supplement this information with additional

information. They often found themselves engaged in repeating work already done by others. Job development was the function most often alleged to be affected unfavorably by the scarcity of recorded and shared data.

3. Costs. $1,200 annually (data processing, etc.).

Component 5. Establishment of Labor Demand by Occupation

1. Definition. This component will supply information about the number of job openings at specific establishments, the characteristics of the jobs, and the employers' hiring specifications.

2. Adequacy of the encountered system. The encountered system is failing to generate sufficient information in the form of job openings; thus the placement function is being seriously impaired. In addition to being scarce, the information that is available is badly biased toward the less attractive jobs.

3. Costs. Absorbed in the conduct of assigned local office and job bank functions.

Component 6. Distribution of Total Employment by Occupation

1. Definition. Component 6 will provide information on the occupational composition of the employed work force for specified geographic areas. These data will be collected by means of an annual manpower survey and will be compatible with the materials released through the Occupational Employment Statistics program being implemented by the U.S. Department of Labor.

2. Adequacy of the encountered system. A skill survey covering Alameda County was prepared in 1967, and a study of the San Francisco-Oakland Standard Metropolitan Statistical Area (SMSA) was completed in 1963. The results of these studies are largely outdated now, however, and the methodology used to collect the information appearing in these studies has since been criticized for its inability to provide reasonably accurate forecasts.

3. Costs. First year, $21,000 for statistical programming and computer time; subsequent years, $5,000 (mostly data processing). These figures are incremental to the costs of implementing Component 3.

Component 7. Characteristics of "Typical Job" by Occupation

1. Definition. This component consists of six subsets of information

which describe the characteristics and usual kind of work performed by persons having selected occupational qualifications. These subsets are: (1) nature of the job, (2) hours and pay, (3) job tenure, (4) industrial - relations practices, (5) how to find the job, and (6) career patterns and advancement.

2. Adequacy of the encountered system. The information being provided was criticized on two counts: first, that its validity could not be determined; and second, that very little local information was available--or at least retrievable--on most of the information subcomponents.

3. Costs. $160,000 per year, which includes salaries, fringe benefits, and related overhead items for additional research staff. Costs of Components 7, 9, 13, and 14 are consolidated in the above estimate.

Component 8. Indicators of Labor Supply by Occupation

1. Definition. This component is comprised of a number of elements that are indicative of the current labor supply in specified occupations. Each element provides indicators as to magnitudes and trends in the volume of labor supply by occupation. These indicators are needed by intermediaries who must make judgmental estimates of the supply of labor for various occupations. The elements comprising this component are: (1) data on current registered (employment service) jobseekers by occupation; (2) data on persons currently in training; and (3) followup data on trainees.

2. Adequacy of the encountered system. The major inadequacy in current data sources has been the failure of the employment service registration procedures to identify and record the total volume of jobseekers making themselves known to the California Human Resources Development (HRD) system. Next has been the failure of the HRD system to compile and disseminate available data in usable form.

3. Output. Data will cover employment service (ES), unemployment insurance (UI), and Manpower Development and Training Act (MDTA) clients. Reports will be prepared at least monthly on a local-office-area basis for selected occupations.

4. Costs. $2,000 per year.

Component 9. Characteristics of "Worker Customarily Hired" in the Occupation

1. Definition. Component 9 will supply information pertaining to the characteristics, traits, and qualifications generally observed as being associated with employer acceptance in the occupation throughout a specified area. Five specific data subsets will be provided. These will include

(1) general worker traits; (2) characteristics related to successful job performance; (3) educational and training background; (4) affiliations; and (5) specific employer characteristics.

2. Adequacy of the encountered system. Very little local information is available on most of the subcomponents, and additional studies are needed to determine the proper design of individual items within the subcomponents. The educational and training background required of the worker, if he is to be hired, is of utmost importance to many classes of users.

3. Costs. The costs of Components 7, 9, 13, and 14 have been consolidated under Component 7.

Component 10. Indicators of Labor Demand/Supply Relationships by Occupation

1. Definition. This component consists of a number of elements which may provide indications as to magnitudes and trends in labor demand/supply relationships. The data elements included are: (1) UI claimants by occupation; (2) ES job openings by occupation; and (3) placement experience by occupation. The relationship is difficult to measure statistically since data are not available for either the total labor supply or the total numbers of persons entering and leaving jobs by occupation.

2. Adequacy of the encountered system. Respondents thought that the existing information system failed to supply them with either reliable information or the market data they required to arrive at their own judgments as to the current supply and demand relationship. Another important deficiency was the lack of timeliness.

3. Costs. $2,000 per year for programming, data processing, and reports.

Component 11. Anticipated Short-Term Total Labor Demand by Occupation

1. Definition. This component will supply information on the total number of job openings that are expected to occur in a given labor market area for selected occupations over the course of an ensuing two-year period. An important distinction will be made between replacement demand and expansion demand.

2. Adequacy of the encountered system. Three different approaches have been tried by users needing short-term job prospects information--the training needs survey, the area skill survey, and occupational projections based upon census data. Only the area skill survey appears to approach meeting the needs of both educational planners and vocational counselors, but its high cost and inability to remain timely appear to rule it out as a usable instrument for meeting these needs.

3. Output. This component provides an annual set of forecasts of total demand anticipated over the next two years, by occupation.

4. Costs. First year, $36,000 to include programming, data processing, and report; subsequent years, $20,000.

Component 12. Anticipated Longer Term Total Labor Demand by Occupation

1. Definition. This component is designed to supply data on the number of job openings that are expected to occur in a given labor market area for selected occupations over the course of an ensuing five-year period. As in the case of Component 11, a distinction will be made between expansion and replacement needs.

2. Adequacy of the encountered system. The present system is considered inadequate inasmuch as such information for the San Francisco Bay Area is largely nonexistent. Two techniques could be used to gather data--the area skill survey or occupational projections based upon census data. However, the costs of the skill survey would rule out this approach.

3. Output. Same as for Component 11, except that the forecasts would be over a five-year period.

4. Costs. Programming and development costs are included under Component 11. Incremental costs are $22,000 per year.

Component 13. Probable Changes in Characteristics of the "Typical Job"

1. Definition. This component consists of the same six subcomponents that are listed under Component 7. However, the element of probable change in the foreseeable future is now introduced into each subcomponent. The two items having the greatest significance are job duties and the relationship between jobs.

2. Adequacy of the encountered system. The penetration into the current job market by the public employment service was considered inadequate; yet it is the only agency equipped to collect, process, and deliver job information in localized form. Information about future job developments was also considered inadequate because of its lack of credibility.

3. Costs. Costs of Components 7, 9, 13, and 14 have been consolidated under Component 7.

Component 14. Probable Changes in Characteristics of "Worker Customarily Hired" in the Occupation

1. Definition. This component consists of the same five subcomponents listed under Component 9. However, the element of probable change in the foreseeable future is now introduced into each subcomponent. The two most important individual items are the years of school completed and the kind and number of degrees conferred.

2. Adequacy of the encountered system. Some of the criticisms were similar to those leveled at Component 9, with the major criticisms being lack of credibility.

3. Costs. The costs of Components 7, 9, 13, and 14 have been consolidated under Component 7.

Component 15. Current Annual Estimates of the Population by Specified Area

1. Definition. This component consists of annual postcensal estimates of population for specified areas. Local population data will be disaggregated by age and race.

2. Adequacy of the encountered system. Users were concerned not only with the detail by age and race and geographic area of the existing data but also with the validity of the information and the timeliness of its release.

3. Costs. $50,000 for the demonstration project over a two-year period; operational costs of an ongoing program, about $20,000 annually.

Component 16. Current Annual and Quarterly Estimates of the Labor Force

1. Definition. This component will provide, for selected geographic areas, quarterly and annual estimates of the size of the labor force, its ethnic and sex makeup, and the number and corresponding rates for persons employed and unemployed.

2. Adequacy of the encountered system. Monthly and annual estimates of total unemployment and of the size of the labor force are currently prepared; however, they are not detailed by either race or age. There is concern over the validity of the estimates.

3. Costs. $250,000 for the first year; $200,000 for subsequent years.

Component 17. Indicators of Manpower Service Needs by Specified Areas

1. Definition. This component is comprised of information about a variety of subjects relating to the needs of a community for manpower services. The list of indicators includes: (1) mobility, (2) family size, (3) educational attainment, (4) income level, and (5) other social problems; i.e., welfare recipients, arrests, etc.

2. Adequacy of the encountered system. Virtually no information relating to the indicators to be supplied by this component is currently available.

3. Output. The indicators described above would be compiled by specified geographic areas including counties, cities, and defined areas within cities such as poverty areas, Model City neighborhoods, and Community Action Program areas.

4. Costs. $50,000 to develop a two-year demonstration project; operational cost, $17,000 annually.

Component 18. Community Employment Trends

1. Definition. The information to be provided by this component consists of a time series of employment data disaggregated by industry for geographic areas of county or smaller size. Component 6 differs by providing employment data disaggregated by occupational category for specified larger areas.

2. Adequacy of the encountered system. These data do not exist at the present time in a format usable for planning and evaluation activities.

3. Costs. Incremental costs after implementation of Component 1 are $2,500 per year.

Component 19. Community Development and Economic Outlook

1. Definition. There are three subsets of information associated with this component: (1) information concerning the addition of any capital improvement (public or private) or the expansion of existing facilities that will increase or modify employment in the specified area; (2) information concerning the loss of an economic activity that will result in the reduction or modification of employment in the specified area; and (3) information concerning past, present, and projected trends in the San Francisco Bay Area economy with emphasis on projected employment trends by industry and on the relationship of these projections to the assumptions upon which they are based.

2. Adequacy of the encountered system. Information now available under all three subcomponents was termed "inadequate" because there were no current sources, information was not available, or the data were not structured.

3. Costs. First-year costs of a demonstration project to implement subcomponents (1) and (2) above are estimated at $35,000, including setup; thereafter, annual costs should run at about $25,000. The first-year costs of a demonstration project to implement subcomponent (3) above are estimated at $10,000; thereafter costs are estimated at $5,000 per year.

Component 20. Longer Term Employment Projects by Industry (Including Assumptions)

1. Definition. This component consists of projections of employment by a two-digit Standard Industrial Classification (SIC) for two- and five-year forecast periods for each of the San Francisco Bay Area counties.

2. Adequacy of the encountered system. None of the currently available data sources appear adequate to meet the needs of a manpower information system. None make full use of available historical data on employment by detailed industry classification by county, and none are keyed to the objective of producing forecasts by detailed industry.

3. Costs. $25,000 per year for implementing this component by contract with an outside agency. (It would be preferable to have the task performed within HRD.)

Component 21. Community Wage Rates

1. Definition. This component will supply information about current prevailing wage rates for selected occupations in the community.

2. Adequacy of the encountered system. The new data available on current wage patterns are considerable--Bureau of Labor Statistics, California State Personnel Board, etc. No user, however, appeared to be familiar with all of the information available, and some concern was expressed over its validity and timeliness.

3. Costs. Absorbed in the conduct of assigned local office and research functions.

Component 22. Training Opportunities by Occupation

1. Definition. Component 22 provides information describing occupational training opportunities in public and private schools, and information about the number of students enrolled in these courses as well as the number graduating.

2. Adequacy of the encountered system. The present inadequacies were criticized extensively. Comprehensive information in any degree of detail was either not retrievable by occupation or not available at all.

3. Costs. A three-year demonstration research project would cost about $280,000 total, with a breakdown of $100,000 per year for each of the first two years and $80,000 for the third year.

Component 23. Apprenticeship Opportunities by Occupation

1. Definition. This component will provide directory-type information identifying the formal apprenticeship programs active in the San Francisco Bay Area, together with information about the training offered and requirements for entry. It will also include statistical information by program as to numbers of persons indentured and numbers completing the program.

2. Adequacy of the encountered system. Although much of the directory-type information is available through the files of the California Department of Industrial Relations, the U.S. Department of Labor, or individual employers, there is no single source of information. Comprehensive statistical data about the numbers enrolled by program and about completions have not been collected.

3. Costs. $25,000 per year.

Component 24. Licenses, Credentials, and Certificates

1. Definition. This component consists of two quite different types of information. The first is directory-type, detailed information relating to every occupation in which licensure, accreditation, or certification exists, whether or not required for employment in the occupation. The second type of information provides estimates of the proportions of workers in a given occupation who possess licenses or similar evidence attesting to their having met certain qualifying standards, and it details the routes of entry into the occupation for those workers who have not obtained such evidence.

2. Adequacy of the encountered system. Since state law governs most

occupational licensing and certification, the data available are adequate. The only deficiency is that it is not possible to determine what proportion of the present work force in an occupation is licensed or certified, and what alternative routes of entry into the occupation exist for workers who do not possess these kinds of formal evidence of their qualifications.

3. Costs. No additional costs since much of the information represents an ongoing program of another state agency.

Component 25. Employment-Related Supportive Services

1. Definition. The information provided by this component will consist of a description of groups in the community that provide assistance in job placement and vocational counseling as well as other services which may be required if a worker is to enter the labor force.

2. Adequacy of the encountered system. Directories identifying various sources of employment-related services vary greatly by community in their comprehensiveness and accuracy and in the timeliness of the information that they contain.

3. Costs. The costs incurred for the implementation of this component will vary from community to community depending upon the cooperative arrangements worked out between various agencies. Hopefully, the costs will be absorbed by the California Department of Human Resources Development.

Component 26. Unions

1. Definition. The development of this component would provide information relating to union affiliation for all occupations having union representation. The items covered would include: (1) union name, address, local number, and union representative; (2) union entry procedures, requirements, and apprenticeships; and (3) jurisdictional areas and industries, registration requirements, and selection and referral procedures.

2. Adequacy of the encountered system. The present system for gathering union data is one of direct contact with union officials by the California Department of Human Resources Development staff. The information obtained is generally regarded as adequate.

3. Costs. None.

Component 27. Hiring Channels

1. Definition. The information provided here will consist of an overview of the community's significant hiring channels. This information will appraise, by industry, occupation, or type of establishment, the relative importance of different means of recruitment for jobs including sources internal to the firm. It will also be concerned with the characteristics and outcomes of these different means and sources.

2. Adequacy of the encountered system. Little data exist at the national level and none for areas concerning gross movements into and out of employment or between jobs. Descriptive information relating to the operation of various hiring channels is not now available.

3. Costs. Costs of implementing this component are included in Components 7 and 26.

Component 28. Community Commuting Patterns and Transportation Facilities

1. Definition. This component includes: (1) general information about the usual commuting practices of workers in occupations that are significant within specific areas and (2) detailed information about the distances, time, and costs involved in usual commuting patterns.

2. Adequacy of the encountered system. Since the completeness of the general information being gathered varies, this process needs closer supervision. The local Human Resources Development (HRD) offices are not now supplied with the necessary tools for determining "job centers"--the employment concentrations of specific occupations in particular areas. This element is basic in the sequence of fact gathering and reasoning that leads to judgments concerning what are usual or reasonable commuting practices for an occupation.

3. Costs. $35,000 per year for data processing and production costs.

APPENDIX C

SUGGESTED LABOR MARKET INFORMATION AREAS

Figure 1

Six Michigan Areas

Area	1970 Population	Percent of Population
Total	8,875,083	100.0
1	2,666,751	30.0
2	2,064,904	23.3
3	640,477	7.2
4	1,250,014	14.1
5	1,696,150	19.1
6	556,787	6.3

Figure 2

Twelve Michigan Areas

Area	1970 Population	Percent of Population
Total	8,875,083	100.0
1	4,731,655	53.2
2	559,733	6.3
3	378,423	4.3
4	262,054	2.9
5	466,977	5.3
6	263,360	3.0
7	965,813	10.9
8	690,281	7.8
9	94,107	1.1
10	158,333	1.8
11	117,598	1.3
12	186,749	2.1

Figure 3

Fourteen Michigan Areas

Area	1970 Population	Percent of Population
Total	8,875,083	100.0
1	2,666,751	30.0
2	352,582	4.0
3	966,838	10.9
4	745,484	8.4
5	262,054	3.0
6	378,423	4.3
7	559,733	6.3
8	643,581	7.2
9	533,552	6.0
10	263,360	3.0
11	624,733	7.0
12	274,505	3.1
13	299,140	3.4
14	304,347	3.4